Interstellar Asteroid | Superstitious Rituals | UFO Study | Sonic Attack? | New Fellows | Science Ambassadors

Skeptical Inquirer

THE MAGAZINE FOR SCIENCE AND REASON

Vol. 42 No. 2 | March/April 2018

THE WAR ON SCIENCE AND KNOWLEDGE

ANTI-INTELLECTUALISM IN TODAY'S AMERICA

REVIEWS OF
Daniel Dennett
Sharon Hill
Deepak Chopra

Drug Therapy Hype

21 Reasons Noah's Flood Never Happened

CSICon Las Vegas 2017

Colin Wilson's Strange Legacy

INTRODUCTORY PRICE U.S. and Canada $5.99

04

0 09281 02614 3

CSI
Committee for Skeptical Inquiry

Committee for Skeptical Inquiry www.csicop.org

Robyn E. Blumner, President and CEO
Barry Karr, Executive Director
Joe Nickell, Senior Research Fellow
Massimo Polidoro, Research Fellow
Benjamin Radford, Research Fellow
Richard Wiseman, Research Fellow

Fellows

James E. Alcock,* psychologist, York Univ., Toronto
Marcia Angell, MD, former editor-in-chief, *New England Journal of Medicine*
Kimball Atwood IV, MD, physician; author; Newton, MA
Banachek, professional magician/mentalist, magic consultant/producer
Stephen Barrett, MD, psychiatrist; author; consumer advocate, Allentown, PA
Robert Bartholomew, sociologist, investigative journalist, Auckland, New Zealand
Willem Betz, MD, professor of medicine, Univ. of Brussels
Irving Biederman, psychologist, Univ. of Southern California
Susan Blackmore, visiting lecturer, Univ. of the West of England, Bristol
Sandra Blakeslee, science writer; author; *New York Times* science correspondent
Mark Boslough, physicist, Albuquerque, NM
Henri Broch, physicist, Univ. of Nice, France
Jan Harold Brunvand, folklorist; professor emeritus of English, Univ. of Utah
Mario Bunge, philosopher, McGill Univ., Montreal
Sean B. Carroll, molecular geneticist; vice president for science education, Howard Hughes Medical Institute, Madison, WI
Thomas R. Casten, energy expert, Hinsdale, IL
John R. Cole, anthropologist; editor, National Center for Science Education
K.C. Cole, science writer; author; professor, Univ. of Southern California's Annenberg School of Journalism
John Cook, Center for Climate Change Communication, George Mason University, Virginia.
Frederick Crews, literary and cultural critic; professor emeritus of English, Univ. of CA, Berkeley
Richard Dawkins, zoologist, Oxford Univ.
Geoffrey Dean, technical editor, Perth, Australia
Cornelis de Jager, professor of astrophysics, Univ. of Utrecht, the Netherlands
Daniel C. Dennett, Austin B. Fletcher Professor of Philosophy and director of Center for Cognitive Studies, Tufts Univ.
Ann Druyan, writer and producer; CEO, Cosmos Studios
Sanal Edamaruku, president, Indian Rationalist Association and Rationalist International
Edzard Ernst, former professor of complementary medicine, University of Exeter
Kenneth Feder, professor of anthropology, Central Connecticut State Univ.
Krista Federspiel, science journalist, expert on complementary and alternative medicine, Vienna, Austria.
Kevin Folta, molecular biologist, professor and chair of Horticultural Sciences Department, University of Florida.
Barbara Forrest, professor of philosophy, SE Louisiana Univ.
Andrew Fraknoi, astronomer, University of San Francisco
Kendrick Frazier,* science writer; editor, Skeptical Inquirer
Christopher C. French, professor, Department of Psychology, and head of the Anomalistic Psychology Research Unit, Goldsmiths College, Univ. of London
Julia Galef, host of the Rationally Speaking podcast; cofounder, Center for Applied Rationality, Berkeley, CA
Luigi Garlaschelli, chemist, Università di Pavia (Italy); research fellow of CICAP, the Italian skeptics group
Maryanne Garry, professor, School of Psychology, Victoria Univ. of Wellington, New Zealand
Murray Gell-Mann, professor of physics, Santa Fe Institute; Nobel laureate
Susan Gerbic, founder and leader of Guerilla Skepticism on Wikipedia (GSoW) project
Thomas Gilovich, psychologist, Cornell Univ.
David H. Gorski, cancer surgeon and researcher at Barbara Ann Karmanos Cancer Institute and chief of breast surgery section, Wayne State University School of Medicine.
Wendy M. Grossman, writer; founder and first editor, *The Skeptic magazine* (UK)
Susan Haack, Cooper Senior Scholar in Arts and Sciences, professor of philosophy, University of Miami
Harriet Hall,* MD, physician; investigator, Puyallup, WA
David J. Helfand, professor of astronomy, Columbia Univ.
Terence M. Hines, prof. of psychology, Pace Univ., Pleasantville, NY
Douglas R. Hofstadter, professor of human understanding and cognitive science, Indiana Univ.
Gerald Holton, Mallinckrodt Professor of Physics and professor of history of science, emeritus, Harvard University.
Deborah Hyde, skeptic, folklorist, cultural anthropologist, Editor in Chief, *The Skeptic* (U.K.)
Ray Hyman,* psychologist, Univ. of Oregon
Stuart D. Jordan, NASA astrophysicist emeritus
Barry Karr, executive director, Committee for Skeptical Inquiry, Amherst, NY
Lawrence M. Krauss, foundation professor, School of Earth and Space Exploration and Physics Dept.; director, Origins Initiative, Arizona State Univ.
Edwin C. Krupp, astronomer; director, Griffith Observatory, Los Angeles, CA
Lawrence Kusche, science writer
Leon Lederman, emeritus director, Fermilab; Nobel laureate in physics
Stephan Lewandowsky, psychologist, School of Experimental Psychology and Cabot Institute, Univ. of Bristol, UK
Scott O. Lilienfeld,* psychologist, Emory Univ., Atlanta, GA
Lin Zixin, former editor, *Science and Technology Daily* (China)
Jere Lipps, Museum of Paleontology, Univ. of California, Berkeley
Elizabeth Loftus,* professor of psychology, Univ. of California, Irvine
Daniel Loxton, author, editor of *Junior Skeptic* at *Skeptic* magazine (US), artist, Vancouver, B.C., Canada
Michael E. Mann, Distinguished Professor of Atmospheric Sciences and director of the Earth Systems Sciences Center, Pennsylvania State University
David Marks, psychologist, City Univ., London
Mario Mendez-Acosta, journalist and science writer, Mexico City
Kenneth R. Miller, professor of biology, Brown Univ.
David Morrison, space scientist, NASA Ames Research Center
Richard A. Muller, professor of physics, Univ. of California, Berkeley
Joe Nickell, senior research fellow, CSI
Jan Willem Nienhuys, mathematician, Waalre, The Netherlands
Lee Nisbet, philosopher, Medaille College
Steven Novella,* MD, assistant professor of neurology, Yale Univ. School of Medicine
Bill Nye, science educator and television host, Nye Labs
James E. Oberg, science writer
Irmgard Oepen, professor of medicine (retired), Marburg, Germany
Paul Offit, professor of pediatrics, director of the Vaccine Education Center, the Children's Hospital of Philadelphia
Naomi Oreskes, geologist and professor, departments of the History of Science and Earth and Planetary Sciences, Harvard Univ., Cambridge, MA
Loren Pankratz, psychologist, Oregon Health Sciences Univ.
Robert L. Park, emeritus professor of physics, U of Maryland
Jay M. Pasachoff, professor of astronomy and director of Hopkins Observatory, Williams College
John Paulos, mathematician, Temple Univ.
Clifford A. Pickover, scientist, author, editor, IBM T.J. Watson Research Center.
Massimo Pigliucci, professor of philosophy, City Univ. of New York–Lehman College
Steven Pinker, cognitive scientist, Harvard Univ.
Massimo Polidoro, science writer; author; executive director of CICAP, Italy
James L. Powell, geochemist, author, executive director, National Physical Science Consortium
Anthony R. Pratkanis, professor of psychology, Univ. of CA, Santa Cruz
Donald R. Prothero, paleontologist/geologist, Natural History Museum of Los Angeles County, Los Angeles, CA
Benjamin Radford, investigator; research fellow, Committee for Skeptical Inquiry
James "The Amazing" Randi, magician; CSICOP founding member; founder, James Randi Educational Foundation
Milton Rosenberg, psychologist, Univ. of Chicago
Amardeo Sarma,* chairman, GWUP, Germany
Richard Saunders, Life Member, Australian Skeptics; educator; investigator; podcaster; Sydney, Australia
Joe Schwarcz, director, McGill Office for Science and Society
Eugenie C. Scott,* physical anthropologist; chair, advisory council , National Center for Science Education
Seth Shostak, senior astronomer, SETI Institute, Mountain View, CA
Simon Singh, science writer; broadcaster; UK
Dick Smith, entrepreneur, publisher, aviator, adventurer, Terrey Hills, N.S.W., Australia
Keith E. Stanovich, cognitive psychologist, professor of applied psychology, Univ. of Toronto
Karen Stollznow,* linguist; skeptical investigator; writer; podcaster
Jill Cornell Tarter, astronomer, SETI Institute, Mountain View, CA
Carol Tavris, psychologist and author, Los Angeles, CA
David E. Thomas,* physicist and mathematician, Socorro, NM
Neil deGrasse Tyson, astrophysicist and director, Hayden Planetarium, New York City
Indre Viskontas, cognitive neuroscientist, TV and podcast host, and opera singer, San Francisco, California
Stuart Vyse, psychologist, former Joanne Toor Cummings '50 professor of psychology, Connecticut College
Marilyn vos Savant, *Parade* magazine contributing editor
Steven Weinberg, professor of physics and astronomy, Univ. of Texas at Austin; Nobel laureate
E.O. Wilson, Univ. professor emeritus, organismic and evolutionary biology, Harvard Univ.
Richard Wiseman, psychologist, Univ. of Hertfordshire, England
Benjamin Wolozin, professor, Department of Pharmacology, Boston Univ. School of Medicine

*Member, CSI Executive Council (Affiliations given for identification only.)

The Skeptical Inquirer (ISSN 0194-6730) is published bimonthly by the Center for Inquiry in association with the Committee for Skeptical Inquiry, P.O. Box 703, Amherst, NY 14226. Printed in U.S.A. Periodicals postage paid at Buffalo, NY, and at additional mailing offices. Subscription prices: one year (six issues), $35; two years, $60; three years, $84; single issue, $5.99. Canadian and foreign orders: Payment in U.S. funds drawn on a U.S. bank must accompany orders; please add US$10 per year for shipping. Canadian and foreign customers are encouraged to use Visa or MasterCard.

Inquiries from the media and the public about the work of the Committee should be made to Barry Karr, Executive Director, CSI, P.O. Box 703, Amherst, NY 14226-0703. Tel.: 716-636-1425. Fax: 716-636-1733. Email: bkarr@centerforinquiry.net.

Manuscripts, letters, books for review, and editorial inquiries should be sent to Kendrick Frazier, Editor, Skeptical Inquirer, EMAIL: kendrickfrazier@comcast.net. Mail: 944 Deer Drive NE, Albuquerque, NM 87122. Please consult our Guide for Authors for style, reference, and submittal instructions. It is on our website at www.csicop.org/publications/guide.

Articles, reports, reviews, and letters published in the Skeptical Inquirer represent the views and work of individual authors. Their publication does not necessarily constitute an endorsement by CSI or its members unless so stated.

Copyright ©2018 by the Center for Inquiry and the Committee for Skeptical Inquiry. All rights reserved.

Subscriptions and changes of address should be addressed to: Skeptical Inquirer, P.O. Box 703, Amherst, NY 14226-0703. Or call toll-free 1-800-634-1610 (outside the U.S. call 716-636-1425). Old address as well as new are necessary for change of address, with six weeks advance notice. Skeptical Inquirer subscribers may not speak on behalf of CSI or the Skeptical Inquirer.

Postmaster: Send changes of address to Skeptical Inquirer, P.O. Box 703, Amherst, NY 14226-0703.

cfi A PROGRAM OF CENTER FOR INQUIRY

Skeptical Inquirer March/April 2018 | Vol. 42, No. 2

FEATURES

38
The War on Science, Anti-Intellectualism, and 'Alternative Ways of Knowing' in 21st-Century America
The decades-long academic assault on science has bewildered the American public about the role and function of science, promoted anti-intellectualism, and politically empowered purveyors of supernaturalism and paranormal beliefs.
H. SIDKY

44
Drug Therapy Hype: The Misuse of Data
There are several flagrant examples of hype from cancer and cardiac therapy. The drugs Avastin and Opdivo, which have serious problems, have been greatly overhyped.
REYNOLD SPECTOR

50
Twenty-One Reasons Noah's Worldwide Flood Never Happened
Here's a geologist's critical analysis of false perceptions held by many creationists about the origin of the Grand Canyon and the age of the Earth.
LORENCE G. COLLINS

54
Colin Wilson's Idiosyncratic Literary Legacy
Rather than creating a glorious new literature of positive art, Colin Wilson delivered an odd mix of dodgy philosophy, pulp novels, and paranormal studies—the latter often downright silly.
BRETT TAYLOR

COMMENTARY

14
In Troubled Times, This Is What We Do
KENDRICK FRAZIER

CONFERENCE REPORT

16
CSICON Las Vegas 2017
KENDRICK FRAZIER
PHOTOS BY BRIAN ENGLER

21
Short Takes from CSICON 2017
PAUL FIDALGO

COLUMNS

FROM THE EDITOR
The War on Science and Knowledge.....4

NEWS AND COMMENT
Interstellar Visitor: The Strange Asteroid from a Faraway System / Newly Revealed Secret DoD 'UFO' Project Less Than Meets the Eye / 'Sonic Attack' in Cuba Caused 'White Matter Damage'? The Facts Don't Add Up / 'Cuban Science Panel Blames 'Psychogenic Disorder' / Six New Fellows Elected by Committee for Skeptical Inquiry / FDA to Regulate Some Homeopathic Products; CFI Hails Move / New Mexico Scientists, Teachers Stop Attempt to Taint Science Standards / Canadian Governor General's Defense of Science 'A Breath of Fresh Air' 5

INVESTIGATIVE FILES
Hawking 'Ghosts' in Old Louisville
JOE NICKELL.....26

THE SCIENCE OF SCIENCE COMMUNICATION
Ambassadors for Science
MATTHEW NISBET.....30

BEHAVIOR & BELIEF
Do Superstitious Rituals Work?
STUART VYSE.....32

SKEPTICAL INQUIREE
Just Asking Questions
BENJAMIN RADFORD.....35

NEW AND NOTABLE.....62

LETTERS TO THE EDITOR.....64

THE LAST LAUGH
David vs. Whatsisname
GEORGE HRAB.....66

REVIEWS

The Riddle of Consciousness
HARRIET HALL.....57
From Bacteria to Bach and Back: The Evolution of Minds
by Daniel C. Dennett

Strange Songs from the Fringe
BRIAN REGAL.....60
Scientifical Americans: The Culture of Paranormal Researchers
by Sharon Hill

Yet Another Title on 'Quantum' Consciousness
SADRI HASSANI.....62
You Are the Universe: Discovering Your Cosmic Self and Why It Matters
by Deepak Chopra and Menas Kafatos

Committee for Skeptical Inquiry
"… promotes scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims."

[FROM THE EDITOR

The Wars on Science and Knowledge

When CSICOP and the Skeptical Inquirer were founded, in 1976, the nation was awash in credulous paranormal belief, so much so that our organizing conference was called "The New Irrationalisms." It is now 2018 and a whole new set of anti-rationalist, antiscience, anti-intellectual concerns confront us. These are of a much broader and deeper danger. The attacks are against the very foundations of any democratic society. They delegitimize knowledge, facts, expertise, and science itself. They sow confusion and distrust.

"We now live in a scary and confusing 'post-truth' era of disinformation, 'fake news,' 'counterknowledge,' 'weaponized lies,' conspiracy theories, magical thinking, and irrationalism," anthropology professor H. Sidky writes in our cover story. Many recent SI articles have examined different aspects of this disturbing trend, but in "The War on Science, Anti-Intellectualism, and 'Alternative Ways of Knowing' in 21st Century America" Sidky surveys the whole troubling scene. Like Shawn Otto in his recent book *The War on Science*, Sidky lays primary blame on "the decades-long systematic academic assault on science and rationalism" carried out by a wide range of academic scholars. These postmodernist scholars were so effective in their persistent attacks that science and rationality have, in the minds of much of the public, been delegitimized. Today's political leaders and policymakers grew up with these views. Now the idea that truth is whatever one wants it to be—that objective reality is, well, overrated—carries disturbing new power. We see it everywhere, and we must continue to fight it. Sidky's essay, it seems to me, vibrates in consonance with Kurt Andersen's recent book, *Fantasyland: How America Went Haywire*, recommended reading for all. My own commentary, "In Troubled Times, This is What We Do," in this issue is my clarion call for action.

In their talks at our CSICon 2017 conference in Las Vegas in late October, our colleagues Steven Novella and Eugenie Scott touched on some of what all this means for scientific skeptics. Novella says we are now in a "post-truth world." Scott explains the causes of knowledge-resistance and reminds us that the current antiscience movement is not against all science—which she notes remains popular—but only certain ones. In other words, antiscience is selective and nuanced. It's a slight comfort. Their talks are among those highlighted in our extensive coverage of CSICon in this issue.

CSICon shines as a bright beacon for live celebration of science and scientific skepticism and penetrating examinations of claims and issues where the scientific evidence is misunderstood or misrepresented. It is the same mission we have in SI but has the extra value of bringing scientists and skeptics together in person from all over the world to share their experiences and reinvigorate their enthusiasm. (The five-woman "Science Moms" panel did that for me.) Also, no matter how bad things may seem, we must keep reminding ourselves that scientific discovery is still proceeding strongly and that most people find it worthwhile. (What many have rated the top science discovery of 2017, detecting the collision of two rotating neutron stars, happened only two weeks before CSICon but was dramatically described in the opening talk.) We must also remember that communicating about what scientific thinking is, how real discoveries are made, and how to spot and critique questionable claims is a high and noble calling.

—Kendrick Frazier

Skeptical Inquirer™
THE MAGAZINE FOR SCIENCE AND REASON

EDITOR Kendrick Frazier
DEPUTY EDITOR Benjamin Radford
MANAGING EDITOR Julia Lavarnway
ASSISTANT EDITOR Nicole Scott
ART DIRECTOR Christopher Fix
WEBMASTER Marc Kreidler
PUBLISHER'S REPRESENTATIVE Barry Karr

EDITORIAL BOARD James E. Alcock, Harriet Hall, Ray Hyman, Scott O. Lilienfeld, Elizabeth Loftus, Joe Nickell, Steven Novella, Amardeo Sarma, Eugenie C. Scott, Karen Stollznow, David E. Thomas, Leonard Tramiel

CONSULTING EDITORS Susan J. Blackmore, Kenneth L. Feder, Barry Karr, E.C. Krupp, Jay M. Pasachoff, Richard Wiseman

CONTRIBUTING EDITORS Harriet Hall, Kenneth W. Krause, David Morrison, Massimo Pigliucci, David E. Thomas, Stuart Vyse

Published in association with
CENTER FOR INQUIRY

CHAIR Edward Tabash
PRESIDENT AND CEO Robyn E. Blumner
CHIEF FINANCIAL OFFICER Barry Karr
CORPORATE COUNSEL Nicholas J. Little, Brenton N. VerPloeg
BUSINESS MANAGER Patricia Beauchamp
FISCAL OFFICER Paul Paulin
SUBSCRIPTION DATA MANAGER Jacalyn Mohr
COMMUNICATIONS DIRECTOR Paul Fidalgo
DIRECTOR OF LIBRARIES Timothy S. Binga
VICE PRESIDENT FOR PHILANTHROPY Martina Fern
DIRECTOR, COUNCIL FOR SECULAR HUMANISM Tom Flynn
DIRECTOR, DIGITAL PRODUCT AND STRATEGIES Marc Kreidler
DIRECTOR, CAMPUS AND COMMUNITY PROGRAMS Debbie Goddard
DIRECTOR OF PUBLIC ENGAGEMENT Stephanie Guttormson
DATABASE ADMINISTRATOR Cody Hashman
DIRECTOR, TEACHER INSTITUTE FOR EVOLUTIONARY SCIENCE Bertha Vazquez

BOARD OF DIRECTORS, Edward Tabash (chair), David Cowan, Richard Dawkins, Brian Engler, Kendrick Frazier, Barry A. Kosmin, Y. Sherry Sheng, Andy Thomson, Leonard Tramiel.
Honorary: Rebecca Newberger Goldstein, Susan Jacoby, Lawrence Krauss.

cfi CENTER FOR INQUIRY

CFI Mission: The Center for Inquiry strives to foster a secular society based on reason, science, freedom of inquiry, and humanist values.
Our Vision: A world where people value evidence and critical thinking, where superstition and prejudice subside, and where science and compassion guide public policy.
Our Values: Integrity, Courage, Innovation, Empathy, Learning, and Wonder.

Interstellar Visitor: The Strange Asteroid from a Faraway System

David Morrison

A staple of science fiction has always been aliens from other worlds. As science has revealed the inhospitableness of planets such as Mars and Venus, the source of these fictional visitors has increasingly moved to deep space. Now it has happened—the first visit from beyond. In late 2017, an interstellar asteroid named ʻOumuamua swept through the solar system. Inevitably, it has stirred speculation that it could even be a spacecraft, a messenger from beyond our solar system.

This visitor was discovered on October 19, 2017, with the Pan-STARRS optical telescope on Haleakala, Hawaii, a part of the NASA-supported Spaceguard Survey of asteroids that come close to the Earth. At the time of its discovery, it was 33 million kilometers from Earth and had already passed its closest point to both the Sun and the Earth. As astronomers followed up on the discovery, it quickly became apparent that the orbit of ʻOumuamua was unlike anything seen before. All members of the solar system are gravitationally bound to the Sun, with orbits that are ellipses. This object, however, was travelling far too fast to be part of the Sun's family. Its orbit is a hyperbola, and when discovered it was already rapidly leaving the inner solar system, having passed close enough to the Sun to bend its orbit dramatically.

Although it was too distant for imaging by even large telescopes, its size and shape could be estimated from its brightness and large light fluctuations. Remarkably, ʻOumuamua is highly elongated, with an approximately cylindrical shape. The nominal dimensions are about 200 meters in length and only thirty-five meters across, the most extreme of any natural object known. Large objects such as planets and moons are pulled by their own gravity into roughly spherical shape, and even small asteroids and comets (often described as "potato shaped") rarely have irregularities of more than a factor of two. The extreme shape of ʻOumuamua is as unique as its orbit.

ʻOumuamua is a Hawaiian word meaning "scout" or "first to reach out." Note that the pictures widely published and posted on the Internet are artist's impressions; no telescope has been able to resolve this object. All we know is the large amplitude of its light variation as it tumbles with a period of about eight hours. The most common such portrait makes it look like a shard of rock, but it could just as easily be presented as a broken obelisk or even a cylindrical spaceship.

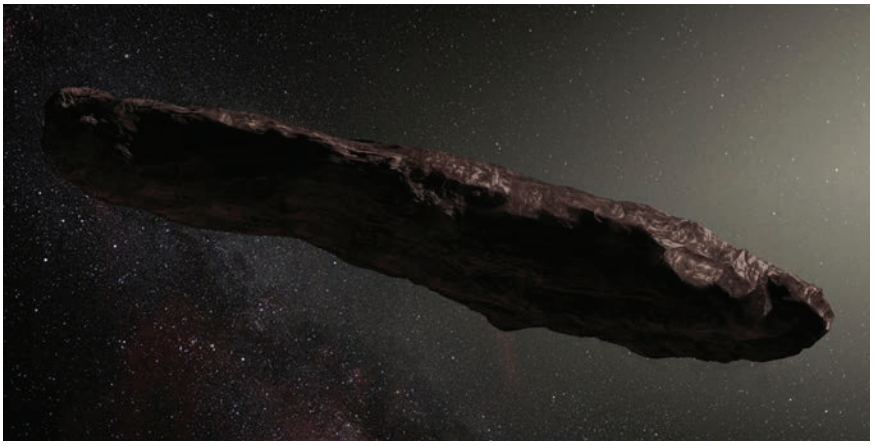


Illustration: M. Kommesser, European Southern Observatory

An artist's conception of the highly elongated interstellar asteroid. There is no telescopic image resolving the fast-moving object.

ʻOumuamua was anticipated by the classic science fiction author Arthur C. Clarke, in his popular 1973 novel *Rendezvous with Rama*.

In a way, the discovery of an interstellar asteroid or comet was not unexpected. Early in solar system history, before the planet orbits had sorted themselves into stable coplanar, nonintersecting paths, we estimate that quite a lot of mass was ejected, either whole planets or more numerous smaller fragments. Even today an occasional comet, coming in from the outer edges of the solar system, can have its orbit changed by gravitational interaction with Jupiter and the Sun. Some are captured into smaller orbits (called short period comets); others are ejected, departing on hyperbolic trajectories. As we have learned recently that exoplanetary systems are common, the question has arisen: Where are similar debris ejected from other planetary systems? Now we have found one, and improved surveys will probably soon add to this category.

ʻOumuamua was anticipated in another way—by the classic science fiction author Arthur C. Clarke, in his popular 1973 novel *Rendezvous with Rama*. In this novel, set in 2130, a fifty-kilometer-long cylinder was discovered entering the solar system on a hyperbolic orbit much like that of ʻOumuamua. The asteroid was named "Rama." Unlike ʻOu-

muamua, however, Rama mysteriously decelerated as it neared the Sun and was captured into a temporary orbit. A team of astronauts rendezvoused with the spacecraft and entered its hollow interior, where they were baffled by the evidence of a highly advanced and mysterious technical civilization. Before they could complete their exploration or be joined by other teams, Rama, having apparently "recharged its batteries" near the Sun, began to accelerate out of the solar system, leaving myriad unanswered questions. Perhaps the discovery of 'Oumuamua will energize the nascent efforts to make a film from *Rendezvous with Rama*. It has been reported that Neil deGrasse Tyson would like to play the science lead in the film.

There is another interesting connection between Rama and 'Oumuamua. In the first chapter of *Rendezvous with Rama*, Clarke described a catastrophic asteroid impact in northern Italy. He suggested that the people of Earth created a Spaceguard program to ensure this never happened again by finding any threatening asteroid or comet well in advance. It is this Spaceguard that discovers Rama. In the early 1990s, when my colleagues and I were proposing an asteroid survey for purposes of planetary defense, we christened it the Spaceguard Survey, with the permission and encouragement of Clarke. It was one of these Spaceguard telescopes that discovered 'Oumuamua.

Although few are suggesting that 'Oumuamua was an interstellar spacecraft, we would like to learn more about it. It is already beyond the reach of our telescopes, but some have suggested that with enough financial resources we might be able to send a small spacecraft to catch up with 'Oumuamua before it departs the solar system. Meanwhile, the SETI radio telescopes at Hat Creek in California and Green Bank in West Virginia did spend several days with multiband receivers pointed at 'Oumuamua. They did not detect any transmissions from it. But even if it is simply an asteroid from a distant solar system, 'Oumuamua would be fascinating to study up close to determine its composition, age, and geologic history. Until now, astronomers have been limited to studying the electromagnetic radiation alone from space beyond the solar system.

'Oumuamua is gone, leaving behind more questions than answers. But it is surely just the first such visitor that will be discovered.

Meanwhile, asteroids that come close to the Earth are frequently in the news, particularly in tabloid articles and social media posts that state or imply they pose a threat of impact. NASA receives a steady influx of questions from the public about an imminent asteroid doomsday. It is a challenging communications problem to explain that while asteroid impacts are real and will happen someday, they are not a present danger. No known asteroid is on a collision course with Earth. Decades ago, astronomers and NASA decided to classify Near Earth Asteroids (NEAs) that can come very close to Earth as "Potentially Hazardous Asteroids (PHA)." Most asteroids in the inner solar system have orbits that, while they may cross the orbit of Earth, are not capable of coming very close or hitting us. "Potentially Hazardous Asteroid" or PHA is a technical description of the asteroid orbit, not an indication that there is any near-term danger of impact. But of course, it is easy to twist the meaning when NASA reports that a potentially hazardous asteroid is headed toward Earth. Some have jokingly suggested the usefulness of a new term for public communications, replacing PHA with PHABNTT: Potentially Hazardous Asteroid—But Not This Time.

David Morrison is a NASA senior scientist who helped found the agency's Spaceguard Survey. He is a Skeptical Inquirer contributing editor and a Committee for Skeptical Inquiry fellow.

Newly Revealed Secret DoD 'UFO' Project Less Than Meets the Eye

Benjamin Radford

In December 2017, *The New York Times* reported on the existence of a secret U.S. Department of Defense program called the Advanced Aerospace Threat Identification Program (AATIP), which sought to research unidentified aerial objects. It began in 2008 and ended in 2012, costing an estimated $22 million over its course.

One of the *Times* piece's coauthors, Leslie Kean, has a documented history of championing UFO reports that turned out to be mistakes and hoaxes.

One of the *Times* piece's coauthors, Leslie Kean, has a documented history of championing UFO reports that turned out to be mistakes and hoaxes. In one case Kean vouched for a famous photo taken in 1990 by a man known only as "Patrick" in the Belgian town of Petit-Rechain. "Patrick" later confessed that the image, twice deemed authentic by a panel of distinguished scientists and experts, was really of a small piece of triangular Styrofoam spray-painted black with lights attached.

Much of the AATIP and its conclusions have not been released, and it's not clear what if any useful information came from the effort. Several short videos of military jets encountering something they couldn't identify have been

released by the program. Already some researchers, including Robert Sheaffer and Mick West, have suggested that distant jets might be the culprit, and in the past, crowdsourced research has yielded answers to seemingly inexplicable phenomena in our skies; a "mystery missile" seen off the coast of California in November 2010, for example, stumped military experts at first but was later determined to be an ordinary commercial jet plane contrail seen from an odd angle.

The fact that the U.S. government had a program dedicated to researching unidentified crafts and objects has caused many UFO buffs to triumphantly announce that they were right all along, that this finally proves that the wall of silence is breaking and the government cover-up is cracking.

There is, however, significantly less here than meets the eye. Given that UFOs are literally unidentified flying objects, the Pentagon's interest in the topic is both understandable and appropriate. After all, unknown objects over American skies could be a threat—whether their origin is Russia, North Korea, or the Andromeda galaxy. The Air Force investigated thousands of unexplained aerial reports between 1947 and 1969, eventually concluding that most of the "UFO" sightings involved clouds, stars, optical illusions, conventional aircraft, or spy planes. A small percentage remained unexplained because of a lack of information.

Video frame of a "UFO" taken by a U.S. Navy F/A-18 Super Hornet.

The fact that the U.S. government had a program dedicated to researching unidentified crafts and objects has caused many UFO buffs to triumphantly announce that they were right all along.

The government routinely spends money to research (and sometimes promote) topics that turn out to have little or no evidence or scientific validity. There are hundreds of federal projects that have been funded despite never having been proven valid or effective, including the Star Wars missile defense program, abstinence-only sex education, and the DARE anti-drug program. The idea that there must be some validity to the project otherwise it would not have been funded or renewed is laughable. From the 1970s through the mid-1990s, the U.S. government had a secret project called Stargate, designed to explore the possibility of psychic powers and whether "remote viewers" could successfully spy on Russia during the Cold War. The research went on for about two decades with little apparent success. Eventually scientists asked to review the results concluded that psychic information was neither validated nor useful. Like AATIP, Project Stargate was soon shut down.

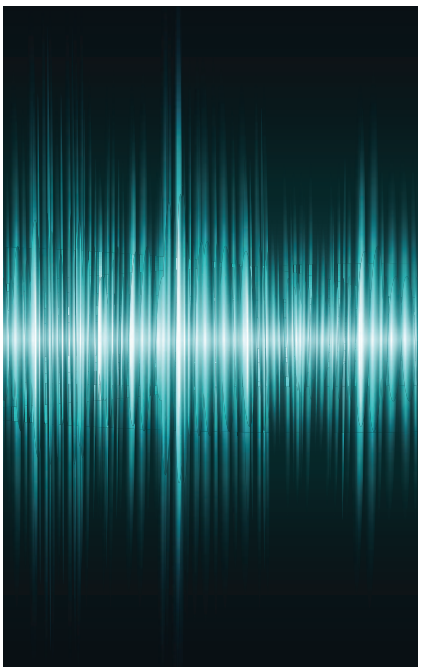
One possible clue as to why the program might have continued despite yielding no clear evidence of extraterrestrials is the financial incentive to keep it going. The *New York Times* noted that "The shadowy program ... was largely funded at the request of Harry Reid, the Nevada Democrat who was the Senate majority leader at the time. ... Most of the money went to a Las Vegas–based aerospace research company run by a billionaire entrepreneur and longtime friend of Mr. Reid's, Robert Bigelow, who is currently working with NASA to produce expandable craft for humans to use in space."

Political pork project or cutting-edge UFO research finally providing evidence of extraterrestrial contact? Pentagon spokesman Thomas Crosson stated that the project ended in 2012 when "It was determined that there were other, higher priority issues that merited funding." Bigelow is welcome to continue the research but will have to spend his own money instead of taxpayer dollars.

‘Sonic Attack’ in Cuba Caused ‘White Matter Damage’? The Facts Don’t Add Up

Robert Bartholomew

It resembles a scene from a James Bond film. Between November 2016 and October 2017, twenty-four staff members at the American embassy in Havana, Cuba, were reportedly sickened after being the target of a mysterious “sonic attack.” Several Canadian embassy personnel also became ill with



Cuban Science Panel Blames ‘Psychogenic Disorder’

A committee of twenty Cuban scientists tasked with examining the claims has found no evidence to support that an acoustical attack took place. After a nine-month study, the panel reported on December 5, 2017, that the U.S. diplomats likely suffered a “collective psychogenic disorder,” not any deliberate “health attack.” For some details, see *Science* magazine reporter Richard Stone’s report from Havana, “Stressful Conditions, Not ‘Sonic Weapon’ Sickened U.S. Diplomats, Cuba Panel Asserts” in the December 8 *Science* and online at http://www.

A photo of the Cuban government’s committee investigating the claims of an acoustical attack, sent to our author Robert Bartholomew by a panel member. Photo credit: Dionisio Zaldivar Perez.

symptoms ranging from "mild brain trauma" to changes in the white matter tracks of the brain. The Associated Press even obtained an audio recording of a high-pitched whine that several diplomats identified as coinciding with the attacks they experienced. Most staff members were "targeted" in their homes and while staying at one of two nearby hotels.

Whatever happened in Cuba, it is almost certainly not the result of a sonic attack. Sonic weapons are bulky, impractical, and inefficient. Attempts to weaponize infrasound—acoustical waves at the low range of human hearing (twenty hertz and below)—have been challenging due to difficulties in focusing the wavelengths. Efforts to develop an ultrasonic weapon—at the upper limits of human hearing (20,000 hertz and above)—have been equally unsuccessful, as the sound waves dissipate rapidly with distance. Most of the waves would simply bounce off the walls of any building.

There is also the problem of explaining the range of symptoms. While claims of concussions and changes in white matter get much of the media attention, most symptoms were relatively mundane and included headaches, dizziness, disorientation, nausea, fatigue, tinnitus, difficulty concentrating, memory problems, confusion, insomnia, hearing loss, vertigo, and nosebleeds.

Most of these complaints have no association with acoustical waves; indeed, I experience a third of them on a weekly basis! As for claims of concussion-like symptoms and white matter anomalies, there is no known association between these conditions and sound waves. Cranial ultrasounds are performed all the time without any white matter tract issues. Furthermore, from basic physics we know that an acoustical wave cannot give you a concussion, as nearly all of the energy would bounce off the body.

We still do not have any specifics in terms of the number of people supposedly affected by the white matter changes. Whatever the number, the sample size is so small that no clear cause-and-effect relationship can be established. Brain scans are not always definitive and are open to interpretation. White matter changes in the brain are common as one ages and are associated with many conditions. Physicians treating some of the patients have told journalists that they plan to publish their findings of brain anomalies in a major medical journal. Until their findings can be scrutinized by the scientific community, we have every reason to be skeptical. Extraordinary claims require extraordinary proof.

In order to get to the bottom of this mystery, doctors and patients should release the scans and redacted medical reports so they can be examined. Whatever is going on, it is almost certainly not a sonic attack. Given the facts as we know them, and the Trump administration's penchant for embracing conspiracy theories, my money is on mass suggestion.

Postscript: On January 9, 2018, the Senate Foreign Relations Committee opened public hearings on the "tracks" amid controversy with Senator Jeff Flake (Republican, Arizona) noting that according to an FBI briefing, there is no evidence of a sonic attack. The latest development in this saga is from the FBI, which reported at press time that after months of on-the-scene investigation in Cuba, there is still no evidence of a sonic attack.

sciencemag.org/news/2017/12/stressful-conditions-not-sonic-weapon-sickened-us-diplomats-cuba-panel-asserts.

The panel, convened in March 2017, includes Cuban neurologists, physicians, physicists, and psychologists. Unfortunately, while the Committee has criticized the U.S. government for a lack of transparency, it too has declined to share medical data and records citing privacy concerns.

My request for any records of their investigation has been denied. However, both governments could easily clear up claims of a cover-up by releasing redacted medical records and other documents related to their investigations, including the findings (or lack thereof) from the FBI.

In my contact with Committee members, I found that although they are well-intentioned, they view the episode through a Cold War lens and are highly suspicious of the Trump administration. Conversely, that same administration is suspicious of the Cuban government and has blamed them for being involved. This case will never be officially resolved to the satisfaction of either government, unless both sides exhibit transparency.

From basic physics we know that an acoustical wave cannot give you a concussion, as nearly all of the energy would bounce off the body.

While the most likely explanation for this strange affair lies with tinnitus, buzzing insects such as crickets, social paranoia, and mass suggestion, the scare continues because of a sense of mutual distrust. Social psychologists have long known that situations of perceived importance, ambiguity and anxiety breed rumors and conspiracy theories. This is exactly what is happening with the proliferation of exotic theories involving secret government weapons and sonic ray guns.

Shakespeare once wrote: "Or in the night, imagining some fear, How easy is a bush supposed a bear!" Perhaps this should be updated to read: "How easy is a cricket or cicada supposed a sonic attack!"

—Robert Bartholomew

Six New Fellows Elected by Committee for Skeptical Inquiry

Six new fellows have been elected to the Committee for Skeptical Inquiry (CSI). They include a magician/mentalist, a sociologist expert on mass hysteria and mass delusions, a "guerilla skeptic," a molecular biologist researching and defending genetically modified foods, the editor of the UK skeptics magazine, and a noted climate scientist.

Fellows are elected for "distinguished service to science and skepticism." Although election is an honorary distinction, fellows serve as advisors to CSI and its magazine, the Skeptical Inquirer, and are invited to share their expertise and advice on issues and projects.

The Committee for Skeptical Inquiry (founded in 1976 as CSICOP, the Committee for the Scientific Investigation of Claims of the Paranormal) "promotes scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims." The shorter name was adopted in 2006.

Fellows are nominated and elected by CSI's twelve-member Executive Council. Elections take place only every several years. The election of this class of new fellows occurred in November 2017 and is being announced here.

The new fellows join a distinguished list of scientists, academics, writers, and activists such as astronomers Neil deGrasse Tyson and Jill Tarter; biologists Richard Dawkins and E.O. Wilson; Nobel laureate physicists or chemists Leon Lederman, Murray Gell-Mann, and Steven Weinberg; philosophers Daniel C. Dennett, Susan Haack, and Mario Bunge; anthropologist Eugenie C. Scott; psychologists James Alcock, Ray Hyman, Steven Pinker, and Richard Wiseman; magician/author James Randi; science educator and television host Bill Nye; *Cosmos* creator/writer Ann Druyan; plus many prominent physicians and medical scientists who critique questionable medical claims.

The full list of fellows appears on the inside front cover of every issue of the Skeptical Inquirer and is published on CSI's website at: https://www.csicop.org/about/csi_fellows_and_staff. Distinguished past fellows (deceased), including Isaac Asimov, Francis Crick, Martin Gardner, Stephen Jay Gould, and Carl Sagan, are honored in CSI's Pantheon of Skeptics at https://www.csicop.org/about/the_pantheon_of_skeptics.

Here are the new fellows:

Banachek (a.k.a. Steve Shaw), professional magician and mentalist.

As a young magician, Banachek was one of the participants in James Randi's famous Project Alpha Hoax in the 1980s, where he fooled scientists at Washington University's psi lab into thinking he had real psychic powers. He later participated in Randi's investigation of Peter Popoff. He directed Randi's Million Dollar Challenge. Banachek has twice been APCA College Entertainer of the Year and has been International Magicians Society Mentalist of the Year. He has received the Society of American Magicians Milbourne Christopher Award for Mentalism. He is the Magic Producer of over 100 magic episodes of television with Criss Angel. He is author of numerous best-selling books on mentalism and an inventor of various magic and mentalism effects, including the Penn & Teller bullet catch. He has performed on over 225 television shows and over 300 radio programs. He has participated in several CSICOP conferences and spoke at CSICon 2016.

Robert Bartholomew, sociologist, investigative journalist, Auckland, New Zealand.

Bartholomew has earned the respect of the skeptic community through his sociological studies on mass hysteria, moral panics, social delusions, folklore, and the paranormal. A native New Yorker, he teaches history at Botany College in Auckland, New Zealand, and has degrees in sociology from the State University of New York at Albany, The Flinders University of South Australia, and James Cook University in Australia.

His books include *American Hauntings: True Stories Behind Hollywood's Scariest Movies* (with CSI's Joe Nickell), *A Colorful History of Popular Delusions*, *Outbreak: The Encyclopedia of Extraordinary Social Behavior* (with Hilary Evans), *Mass Hysteria in Schools: A Worldwide History Since 1566*, *The Untold Story of Champ: A Social History of America's Loch Ness Monster*, *The Martians Have Landed: A History of Media-Driven Panics and Hoaxes* (with CSI's Benjamin Radford), and *American Intolerance: Our Dark History of Demonizing Immigrants*, among many others.

Kevin Folta, professor and chair of Horticultural Sciences Department, University of Florida.

Folta has a PhD in molecular biology from the University of Illinois at Chicago. From 2007 to 2010 he helped lead the project to sequence the strawberry genome, and he continues to research photomorphogenesis in plants, the compounds responsible for flavor in small fruits, and small molecule discovery for new antibiotics and plant growth regulators. He trains scientists, physicians, students, farmers, and others on how to perform public outreach on scientific or controversial topics. He is a leading voice in communicating the evidence-based risks and benefits of genetic engineering in crops and medicine and a defender against misinformation in food and farming, as well as misinformation about evolution, vaccines, climate change, and agricultural biotechnology. He hosts the evidence-based podcast *Talking Biotech* and the blog *Illumination*. He was a speaker at the past two CSICons.

Susan Gerbic, founder and leader of the Guerilla Skepticism on Wikipedia (GSoW) project.

Gerbic's GSoW project has made a major contribution to the skeptic movement by ensuring that skepticism-related Wikipedia pages on topics, claims, and individual scientists/skeptics are accurate, thorough, and well cited. With a global membership, the group writes and translates pages into multiple languages. This project has greatly advanced the cause of skepticism nationally and internationally. Gerbic has recruited, trained, and mentored a large international group of Wikipedia editors knowledgeable about scientific skepticism and skeptical topics.

Gerbic is a skeptical activist, investigator, mentor, conference speaker, writer, cofounder of Monterey County Skeptics, Skeptical Inquirer contributor, and a recurring contributor to the *Skepticality* podcast. While her particular focus has been "grief vampires" (psychics), her activism encompasses all areas of skepticism.

Deborah Hyde, British skeptic, folklorist, cultural anthropologist, and Editor in Chief of *The Skeptic* (UK).

Hyde writes and lectures extensively about superstition, cryptozoology, religion, and belief in the paranormal with special regard to the folklore, psychology, and sociology behind these phenomena.

She also introduced the Ockham Awards to reward successful skeptical activism, which have become a standard part of the QED annual conference in Manchester, United Kingdom. This past year a new category was introduced—the "Rusty Razor" award for the worst bit of pseudoscience of the year. It deservedly went to the GOOP website, garnering massive media coverage. Hyde is a gifted communicator specializing in the area of what she refers to as "the malign supernatural." She does engaging presentations on the origins of belief in beings such as vampires, werewolves, fairies, ghosts, etc., bringing a wealth of historical knowledge to the topics as well as extensive knowledge of psychology and folklore. She advocates for skepticism and critical thinking in the media as well.

Michael E. Mann, Distinguished Professor of Atmospheric Sciences and director of the Earth Systems Sciences Center, Pennsylvania State University.

A noted climate research scientist, Mann has contributed to the scientific understanding of historic climate change based on the temperature record of the past thousand years. He has pioneered techniques to find patterns in past climate change and to isolate climate signals from noisy data. Mann is author of more than 200 peer-reviewed and edited publications and author of three books: *The Madhouse Effect* (2016), *The Hockey Stick and the Climate Wars* (2012), and *Dire Predictions: Understanding Global Warming* (2008). He has been a contributor to the Intergovernmental Panel on Climate Change (IPCC) assessments of climate science. He is a fellow of the American Meteorological Society, the American Geophysical Union, and the American Association for the Advancement of Science and recipient of the Hans Oeschger Medal of the European Geosciences Union. Cofounder of the RealClimate website, he is active in public outreach and countering misunderstandings about the findings of climate research. He has been a speaker at the past two CSICons.

FDA to Regulate Some Homeopathic Products; CFI Hails Move

Kendrick Frazier

It's finally happened. Homeopathic remedies are going to come under some regulatory oversight in the United States.

The U.S. Food and Drug Administration (FDA) announced on December 17 that it is taking a new, harder line on homeopathic products, targeting products that science and evidence indicate pose the greatest risk to Americans' health and safety.

The Center for Inquiry (CFI), which had long been campaigning for regulation of homeopathic drugs, welcomed the move.

It's finally happened. Homeopathic remedies are going to come under some regulatory oversight in the United States.

The FDA said it would focus on situations where homeopathic treatments are being marketing for serious diseases or conditions but have not been shown to offer clinical benefits. The new policy also covers situations where products labeled as homeopathic contain potentially harmful ingredients or do not meet current good manufacturing practices.

Since 1988, drug products labeled as homeopathic have been manufactured and distributed without FDA approval.

"In recent years, we've seen a large uptick in products labeled as homeopathic that are being marketed for a wide array of diseases and conditions, from the common cold to cancer," said FDA Commissioner Scott Gottlieb, MD. "In many cases, people may be placing their trust and money in therapies that may bring little to no benefit in combating serious ailments, or worse—that may cause significant and even irreparable harm because the products are poorly manufactured, or contain active ingredients that aren't adequately tested or disclosed to patients. … We respect that some individuals want to use alternative treatments, but the FDA has a responsibility to protect the public from products that may not deliver any benefit and have the potential to cause harm."

The FDA noted that over the past decade the homeopathic drug market has grown exponentially, "resulting in a nearly $3 billion industry that exposes more patients to potential risks associated with the proliferation of unproven, untested products and unsubstantiated health claims."

"FDA's decision to strengthen regulation of homeopathic junk is a major victory," said Ronald L. Lindsay, former president and CEO of CFI. He noted that CFI was one of the few nonprofit organizations that consistently lobbied for improved regulation. "We promote critical thinking and science across the board, whether it's examination of claims about religious miracles or drugs with miraculous properties."

"For years, the Center for Inquiry has pushed for the government to protect consumers against the pseudoscientific sham that is homeopathy," said Nick Little, CFI's Vice President and General Counsel. "Science shows homeopathic products to be at best nothing more than placebos, and at worst, a serious health risk with fatal consequences for some."

"Homeopathy is marketed as a 'natural' way to treat maladies, when in fact it has proven to be both ineffective and often harmful," said Little. "To add insult to injury, when these manufacturers dupe consumers into purchasing sugar pills and fancy labeled vials of water, they are defrauding them of their money."

CFI, drawing upon expertise from physicians and medical scientists in its Committee for Skeptical Inquiry, has diligently worked to ensure homeopathic products are effectively labeled and has given testimony to the FDA and Federal Trade Commission (FTC) by their invitation. CFI is seeking to work with the FTC to enforce the policy it announced in 2016 regarding the labeling of such products and urging retailers to protect their customers by providing adequate information. CFI is currently preparing an action under District of Columbia consumer protection law to prevent further swindling by the manufacturers of homeopathic sham treatments.

Said Little, "While we're excited by this announcement by the FDA, we're also concerned that they follow through."

Canadian Governor General's Defense of Science 'A Breath of Fresh Air'

Julie Payette is far from your usual bureaucratic official. Even so, her defense of good science and swipes at climate contrarians and believers in divine intervention was refreshing to science supporters and the science-minded.

Payette is Canada's new governor general. That's a symbolic position, where she is the state-appointed representative of the Queen. Generally, they are supposed to be impartial overseers of the democratic process and not involve themselves in politics or spiritual matters.

New Mexico Scientists, Teachers Stop Attempt to Taint Science Standards

Kendrick Frazier

New Mexico has a vibrant scientific community, with two world-class national laboratories (Los Alamos and Sandia), the Santa Fe Institute, astronomical observatories dotting its southern mountains, research universities, and noted biomedical and microelectronic research facilities.

So perhaps it should not be such a surprise that when the state's public education department said it wanted to make a few changes and deletions to the nationally recognized Next Generation Science Standards (NGSS) for public schools that the state's scientists and educators rose up in defiance.

The proposed changes would have deleted key terms and concepts such as evolution and the 4.6-billion-year age of the Earth. Specifically, "evolution" would be called "biological diversity," the specific age of the Earth would be changed to "geologic history," and a "rise in global temperatures" would be changed to "temperature fluctuations."

The secretary-designate of the New Mexico Public Education Department didn't say who had asked for the changes, or why, except to make some vague reference to unspecified "stakeholders."

The outcry was immediate, loud, and persistent.

The New Mexico Academy of Sciences, New Mexicans for Science and Reason, and the Coalition for Excellence in Science and Engineering all issued statements condemning the move. Local scientists and teachers organizations did the same. National science teacher and biology organizations joined in as well. *The Albuquerque Journal* did critical reporting on the effort and eventually editorialized against the changes. One issue of the Sunday *Journal* published nearly a full page of letters to the editor, all but one expressing concerns about the proposed revisions. Hundreds of people (including me) wrote letters and emails to the public education department opposing the changes. So many scientists, teachers, professors, even faith leaders attended a public hearing in Santa Fe to oppose the changes that many had to stand at the back doorway or out in the hall. "I didn't hear a single argument against adopting the NGSS standards [without change]," said one participant, a physician, after listening to six hours of testimony.

And then, just as suddenly as the controversy arose, it ended. The Public Education Department announced on October 25 that it had decided to adopt the NGSS standards "in their entirety." None of the changes to the science standards it had proposed the previous month would be made.

Public Education Secretary-designate Christopher Ruszkowski said the public debate had become a distraction to the vital work of implementing good standards to "raise the bar" on science education.

It was all over, a quick, intense, and somewhat perplexing flap—once again showing how vigilance is necessary and quick, overwhelming response can work in defending good science standards from those who would adulterate them. ■

Julie Payette, STS-127 mission specialist, is pictured near a window in the Kibo laboratory of the International Space Station in 2009 while Space Shuttle *Endeavour* remains docked with the station.

But at the Canadian Science Policy Conference in November, Payette, fifty-four, made international headlines when she argued for greater public acceptance of science. She said it is time for Canadians to move away from false beliefs such as astrology and divine intervention and speak out against people who insist climate change isn't real and isn't being caused by human activities.

"So many people ... still believe—want to believe—that maybe taking a sugar pill will cure cancer ... and that your future ... can be determined by looking at planets coming in front of invented constellations," she said in her speech. Referring to creationists, Payette said we're "still debating and still questioning whether life was a divine intervention" or whether it came from the natural process of Darwinian natural selection.

"We are a government grounded in science," said Canadian Prime Minister Justin Trudeau.

She received considerable criticism that the governor general shouldn't involve herself in such matters, but Prime Minister Justin Trudeau defended her speech, saying she stands in support of science and the truth. "We are a government grounded in science," said Trudeau.

Payette is a computer and electrical engineer by training and, as astronaut for the Canadian Space Agency, has flown on two Space Shuttle missions, in 1999 and 2009, logging twenty-five total days in space. Trudeau appointed her governor general in July 2017, and she hasn't wasted any time promoting science. Concluded Gizmodo.org reporter George Dvorsky in an article on her efforts, "Payette's tone may have been harsh, but in this bewildering era of anti-science, her words were a breath of fresh air."

In Troubled Times, This Is What We Do

KENDRICK FRAZIER

I have often written in the Skeptical Inquirer about how what we do is a communal activity. There is a dynamic interaction between our authors/investigators who prepare our articles, reports, critiques, and reviews and our intelligent and curious readers, supporters, and conference attendees who provide moral (and financial!) support, information, ideas, and informed feedback. This is one of the decidedly cool things about the skeptical community. Everyone can contribute in some way.

And what is it we all do? Well, to quote the short version of the mission statement of SI and our Committee for Skeptical Inquiry that appears in every SI: We promote "scientific inquiry, critical investigation, and the use of reason in examining controversial and extraordinary claims." That's all! Yes, that mission is rather broad. And that is exactly what we try to do. We bring all the tools of evidence-based critical inquiry to popular questions and urgent issues that fascinate, mystify, confuse, and befuddle people. We seek scientifically validated information about issues and assertions and then provide a clear evaluation of those claims.

We call this activity "scientific skepticism." I often think of it as a field of intellectual and scientific inquiry that I call "Science & Skepticism." It is highly interdisciplinary. It draws upon all scientific fields. It also draws upon everything we know about human behavior, individually and in groups. It draws upon everything we know about how we think and how our brains work. It draws upon the great traditions of philosophy, beginning with the ancient Greek philosophers who founded rationalism (a purely scientific inquiry into the nature of man and the universe), humanism, and the concept of the individual. And it also embraces history and the humanities.

Our quest seeks to understand not only the external world of nature out there but our own selves, what makes us human—wonderful and creative, flawed and exasperating.

Our quest seeks to understand not only the external world of nature out there but our own selves, what makes us human—wonderful and creative, flawed and exasperating. If we were an academic unit—say the [insert university of your choice] Institute of Science & Skepticism—we would have faculty from virtually every academic department including the schools of medicine, engineering, and law. But we aren't just an academic enterprise. We incorporate nonacademic traditions such as magicians' specialized knowledge of deception, investigative journalists' tools for getting at the truth, science communicators' skills in explaining complex scientific ideas, and skeptical investigators' blending of all these skills. We do all this in the quest to find out what is true and not true about the real world—including ourselves. And then we present those insights to the public in an appealing, understandable way.

What could be more important? Especially at this troubled time in our political and cultural history

- when fact and fiction are being blended at the highest levels of government;
- where beliefs and opinions are accorded greater sway than facts and evidence;
- where important science-oriented federal agencies are now headed by people who are not only scientifically uninformed but are defunding and in some cases even dismantling key parts of their agencies' scientific missions;
- where our political system is corrupted by "conspiracy theories and outright fabrication";

(Lest you think these remarks are partisan—our effort is decidedly

nonpartisan—I point out that that last item is a quote from former Republican President George W. Bush's remarkable speech in New York on October 19 about internal threats to American democracy.)

• where longtime, legitimate, responsible, independent, mainstream news organizations are labeled "fake" and where scurrilous online "news" operations that really *are* fake disseminate intentional disinformation that too often gets accepted as true;

We need independent, evidence-based, science-based critical investigation and inquiry now more than perhaps at any other time in our history. And that's what we do. That's what all of us in the skeptical community do.

• where Russian meddling in our elections and in our social media causes further confusion and damage to our democracies;

• where pseudoscientific medical concepts and techniques have made deep inroads into our medical schools and universities, and to enable that to happen proponents undermine the very idea of science;

• where genetically modified foods and organisms that can alleviate terrible diseases and help feed malnourished people in poor parts of the world are opposed by well-funded groups and well-off celebrities who think "organic" and "natural" foods are somehow better and not the product of a giant marketing industry;

• where religiously motivated leaders in our states, communities, and school boards continually try to sneak pseudoscientific, creationist ideas into public school curricula and try to prevent teaching evolution or even the age of the Earth;

• where a new flock of predatory journals that don't bother with the conventions of scientific integrity openly publish nonsensical and pseudoscientific papers in the guise of science; and

• where, overall, a kind of Orwellian, *1984*, Bizarro parallel world in which up is down and in is out afflicts our senses and deeply troubles our psyches.

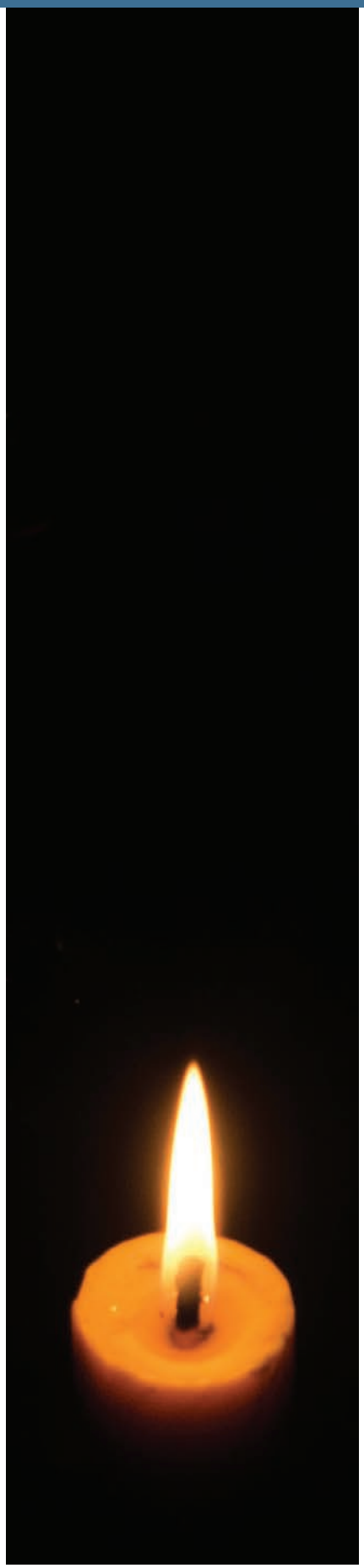
We need independent, evidence-based, science-based critical investigation and inquiry now perhaps more than at any other time in our history. And that's what we do. That's what all of us in the skeptical community do.

We all must support critical inquiry and evidence-based thinking. We must honor those who do it, often at considerable sacrifice to themselves. We must gain a better understanding of how to encourage science-based thinking in others. We must help create a better informed and more enlightened nation and world.

Not just for us, but for the younger generations who succeed us. Let's leave this world better than it is now.

It is the challenge of our lifetime. Let's get to it. ■

Kendrick Frazier is editor of the Skeptical Inquirer and a fellow and member of the Executive Council of the Committee for Skeptical Inquiry. He delivered a slightly different version of this commentary as welcoming remarks at the CSICon 2017 conference in Las Vegas.



CSICON LAS VEGAS 2017

A Festival of Scientific Skepticism or a Theme Park for Science and Reason? CSICon Las Vegas 2017 Had It All

KENDRICK FRAZIER
PHOTOS BY BRIAN ENGLER

You might have known things were going to be different when Center for Inquiry CEO Robyn Blumner in her opening remarks impersonated a certain president of the United States mocking the assembled skeptics for their "reality-based" view of the world and their love of facts, evidence, science, and reason. Good luck with *that*, said the confident U.S. leader, who in this case seems to know what he's talking about.

That disquieting theme resonated for a time throughout the conference, but it quickly got on to science with another of physicist Lawrence Krauss's "isn't science mind-boggling?" talks. This time he chose mysteries of the sun as his starting point. He soon got to the 1939 discovery of fusion as the sun's energy source, then went on to the neutrinos that whiz unnoticed through our bodies, our homes, indeed our entire planet by the trillions every second, and then to the discovery that they can change forms en route. And that took him to deep mysteries of the universe, cosmic inflation, and dark matter and energy. Then the discovery just two weeks earlier of gravitational waves from the collision of two orbiting neutron stars. It led astronomers to turn their telescopes to that point in space and observe gamma rays, X-rays, radio waves, visible light, and other stuff from this gargantuan collision. And out of that discovery, already, has come the realization (or confirmation) that vast amounts of gold (perhaps one Earth mass worth) are created in each such event. Our precious metals originate in the collisions of orbiting neutron stars. "Isn't it amazing!" he exclaimed. We could only agree.

We were off to an exuberant start. "A festival of scientific skepticism"

Robyn Blumner opens as our U.S. President.

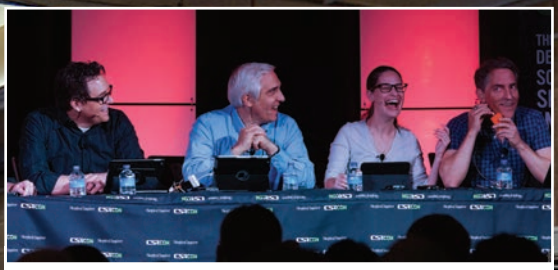
Skeptical Inquirer Editor Kendrick Frazier

"The conference, by any measure was a great success," says Barry Karr, CSI executive director. "There were so many highlights, so many wonderful moments, speaker after amazing speaker, so many social events mixed in."

indeed, as I had predicted in my opening remarks following Blumner's. CSICon Las Vegas 2017, the Committee for Skeptical Inquiry's annual conference dedicated to science and skeptical inquiry, was underway. It proved to be the biggest and arguably the most successful yet (the fourth in the CSICon series and the second straight in Las Vegas). Five hundred sixty participants crowded the conference rooms, and, as far as I could see, most of them attended every session over the three days. Comments heard and volunteered were overwhelmingly positive. Many vowed to return. Next year's conference will be moved to a bigger venue in Las Vegas (see the back cover of this issue for details).

"The conference, by any measure, was a great success," says Barry Karr, CSI executive director and CSICon organizer. "There were so many highlights, so many wonderful moments, speaker after amazing speaker, so many social events mixed in. Hundreds of your fellow skeptics on hand. Now I know what a young child feels like after visiting four theme parks at Disney World in three days! If you were there, you know what I mean. If you weren't—well, there is always next year."

The three-plus days covered virtually every imaginable topic of concern to scientific skeptics—from the rise of institutionally based medical quackery to naturopathy (three talks, one by a former naturopath), to opposition to vaccines and genetically modified foods, to climate change denial, to why people are so resistant to knowledge, to conspiracy theories, to surviving in the post-truth world, to a small experimental examination of the question of whether God influences sports, and to people's weird dislike of "chemicals," even though



Jay Novella, Steven Novella, Cara Santa Maria, and Robert Novella share a light moment during a taping of their *Skeptics' Guide to the Universe* podcast before the live CSICon audience. Steve Novella also gave a key lunchtime talk (page 9).

Physicist Taner Edis speaks on creationism, cranks, and conspiracy theories in the Islamic world, especially Turkey, before the large CSICon 2017 audience.

Woody Kaplan asks a question, as host and emcee George Hrab looks on.

everything, and everyone, is made of them.

The inimitable skeptic George Hrab served as conference emcee, keeping everything on track and entertaining us with his witty takes on, well, just about anything that occurred to him. (The Last Laugh essay in this issue is one; he read that before one session.) Another was a song he'd written (and was to record later that week). He sang and played it for us on the guitar. It was mocking how when disasters happen, the pious seem to think we should all be comforted by "thoughts and prayers." I didn't get all of the first verse, but it included, "Thoughts and Prayers, … A way to put on airs. / Like rearranging the Titanic's deck chairs. / Who cares if it does any good. / I've had enough of your Thoughts and Prayers."

The conference was indeed full of memorable moments, but, for me, a few stood out:

Britt Marie Hermes on "The Bloody Work of Naturopaths." Yes, that was her title. She was a naturopath herself, for three years. She got a degree as a naturopath doctor from Bastyr University. She really thought she was in medical school and that it was a real degree. She called herself Dr. Britt. She thought she got a good education at the time; she had been brainwashed she says now. She calls it "My complete and utter delusional thinking." Nothing was as had been portrayed to her.

Richard Dawkins and Richard Wiseman playfully spar in their on-stage interview.

"In reality, naturopathic schools teach pseudoscience." She said there was some real science mixed in, "but the B.S. outweighed any real science." What about the naturopathic medical board? "It exists to protect naturopathic doctors," she said.

They had a plant to be administered for every disease. She saw ozone being injected into patients' anuses and vaginas. A woman patient's baby died after being given homeopathy in birth, and Bastyr taught "The Ancient Art of Bleeding," in which they strike the skin repeatedly with a seven-star hammer until it bleeds. One treatment for herpes was to bleed the knees. "Naturopathic doctors can get away with anything," she lamented. "There is no standard of care."

"Bastyr has blood on its hands," she proclaimed. They teach "a bogus system of medicine." They think what they are doing is legitimate, but they are "legitimizing quackery." She says practitioners should be stripped of the N.D. title ("An N.D. is not a doctor"), and the schools should "take the nonsense out of the forefront."

"I did a lot of unacceptable things as a quack doctor," she ended. "I'm lucky no one got hurt."

Science Moms. That is the name of a group of women scientists who have organized to speak out for good science and against nonscientific thinking about vaccines, GMOs, and women's health issues. It is also the title of a new documentary film about their efforts. They all came to CSICon's "Science Mom's" panel and brought the film with them. We were the first audience to see it. You can now download it on the Internet, and it is worth your time. They also have a Science Moms Facebook page. The Science Moms are Kavin Senapathy, Alison Bernstein, Layla Katiraee, and Jenny Splitter. Natalie Newell, the film's producer and director, was also on the panel. The Science Moms are courageous and outspoken. They get a lot of flack from people exposed to all the misinformation out there, and they counter it with real science. They are my new heroes of scientific skepticism.

Moms are particularly vulnerable to pseudoscience that promotes fear and hype, and these women scientists are doing their best to counteract that. Mar-

keters prey on the fact that being a parent is a bit scary, and they have found that promoting fear is an effective marketing ploy. Scaring parents works; they'll spend big bucks trying to make sure their children are safe.

"We wanted to provide a voice for moms based on science and evidence," as one of them said. That they have done.

The anti-GMO movement is one area where they are trying to provide better information. They point out that the vast majority of the foods we eat—with the exception of wild game, herbs, and mushrooms—have been genetically altered. There is a huge problem of vitamin A deficiency in the world, and genetic modifications can make rice enhanced in vitamin A. Yet anti-GMO ideology has tragically prevented vitamin A–enhanced rice from reaching the people who need it.

Another marketing ploy is to pretend that organic foods are healthier. But the evidence shows no real health benefits to organic foods. They are just more expensive.

The anti-vaccination movement is manipulated by similar strategies.

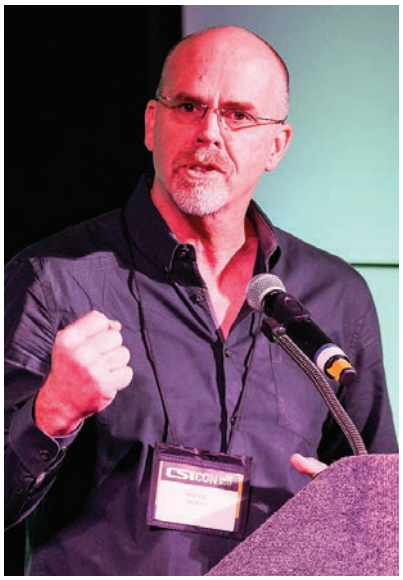
The anti-GMO, anti-vaccination movements have been effective at telling stories and creating scary narratives not based on science or evidence but with tremendous emotional power. The Science Moms panel challenged listeners to be part of a new narrative, based on evidence and reason. As the film's subtitle says: "Facts, not Fear."

The Richard Dawkins-Richard Wiseman on-stage conversation. What a delight! These two well-known scientists brought their dry British wit to the stage, and it was almost as much fun watching their reactions to each other as listening to what they said. Psychologist Wiseman would get a mischievous look on his face, lean forward, and then hit his friend Dawkins the evolutionary biologist with a wry question out of left field. The still-rosy-cheeked Dawkins would hesitate for a moment. Then his eyes would twinkle, a little smile would break out, and he'd hit back with an equally unexpected answer.

An hour of discussion is impossible to summarize, but here are a few highlights. This is Dawkins:

- The mistake early proponents of evolution made was thinking that natural selection focuses on the group rather than the gene. That's why he wrote *The Selfish Gene.* It wasn't a totally original idea. "Neo-Darwianians in the 1930s and 1940s *did* present that idea," Dawkins says, "but not in such an outspoken way." And he described it in "probably a more poetic way."
- There is such a thing as "the evolution of evolvability." Some groups—insects and mammals for instance—once they develop a body plan, that plan makes them more diverse and evolvable. There is a kind of "bursting forth of evolutionary adaptation."
- "People who don't believe in evolution generally don't know anything about it."
- "Godlessness is implicit in everything I've written." His book *The God Delusion* (about three million in worldwide sales so far) has sold even more than *The Selfish Gene.* He takes pleasure having learned that that there is an online Arabic-language edition, pirated, that has been downloaded 13 million times. That tells him that in the Arabic-speaking world there is a hidden "groundswell of irreligion."
- Wiseman asked Dawkins how he can change people's minds. Again the wry smile broke out on Dawkins's face as he replied, "I'm not famous for being good at that."
- Wiseman playfully asked, "What is the *least bad* argument for God?" Dawkins and the audience laughed at that wording. "Fine-tuning," he finally answered. He didn't have to point out for this audience that in his books he has repeatedly and eloquently examined and rejected the fine-tuning argument.
- "Would a sufficiently advanced ET civilization *be* God?" Wiseman asked. The two of them exchanged smiles again at that thought. Dawkins's answer was emphatic. "No. They would still be a result of some evolutionary process."
- Dawkins's next book—he'd written about five chapters at that point and in fact was working on it in free moments during the conference—is a version of *The God Delusion* for young people. He is struggling with the right tone and level for a younger audience. He has

Britt Marie Hermes



Ray Hall

Eugenie Scott

chapters on evolution versus design and now a chapter, "The Good Book," that will, he says, "recount all the horrors in the Bible."

- Wiseman invited a final comment. Dawkins' reply was succinct: "There is such a thing as truth, and the truth is utterly wonderful!"

Steve Novella's Excursion though Skepticism to the Post-Truth World. In a wide-ranging lunchtime talk, Steven Novella, who has become one of skepticism's most prominent leaders, described what he sees as The Arc of Movement Skepticism. When the institutionalized skeptics' movement started, back in the 1970s (that was the start of CSICOP, now CSI), skeptics basically focused on pseudoscience and other fringe elements. For the next twenty years, the main focus was on classic pseudoscience—astrology, psychics, UFOs, and the like. By the 1990s science denial had arisen to be a major problem, and skeptics' focus shifted into issues more political. Attacks increased on science itself and on expertise and science institutions, and these attacks infiltrated medicine and led to the rise of "alternative medicine."

"We've seen a well-funded campaign to infiltrate science," he said. Major efforts suggesting there are alternatives to science strengthened, and proponents lobbied governments to license quacks, changing the rules to suit themselves. Billions of dollars are now at work in the promotion of pseudoscience.

"It is working," Novella lamented. "Pseudoscience has been institutionalized, mainly in medicine." This effort has "eroded the very basis of academia and expertise." Skepticism expanded as well. "We grew tremendously, but our enemies grew even faster."

Now things are even worse. We are in a post-truth world, Novella says, with institutionalized pseudoscience, attacks on expertise and standards, the rise of populism, changes in the rules of science, and the creation of social media echo chambers "where you don't have to defend your facts." The situation has gotten so bad that "we don't have to worry about facts. We can tell any story we want." We are in a mirror-mirror world, where up is now down. "We're walking to stand still," Novella says. "We couldn't have planned for this."

But the skeptical narrative can be powerful as well. Skeptics need to insist that truth and facts matter. Yet, they also have to understand that new psychological understandings of motivated reasoning teach us that countering false beliefs with facts alone doesn't work. "You have to understand where people are coming from. You have to give them an alternative narrative."

What can we do?

Novella urges us to "stay skeptical," separate facts from opinion, don't take attacks personally, continue to fight for science and reason, grow the institutions of skepticism, and defend the institutions of science, academia, and journalism. "Be nimble. Adapt. Nobody knows what's coming. Lobby more, mobilize more."

Eugenie Scott on "Why Knowledge Resistance?" Eugenie Scott's talk later in the conference complemented Novella's in many ways. People are resistant to knowledge for a variety of reasons—but those reasons don't include lack of intelligence or ignorance. If it were ignorance of scientific knowledge, we could fix it with education. Also, she doesn't think it's right to say Americans are increasingly antiscientific. Polls still indicate that Americans are more likely to trust scientists than others. So there doesn't appear to be a large anti-science tendency in America.

Nevertheless, we have science denialism. But it is nuanced, selective. What people seem to be saying is, "I don't like *this* science—not all science." Such people view factual information through a filter. That filter includes ideology, values, and group identity. That filtering can be either beneficial or harmful; "It's not necessarily a bad thing," she says. Context matters. "What's bad is when ideology prevents us from accepting new ideas."

Research indicates that ideology, values, and group identity are so strong that when people are presented factual information that goes against those elements, they believe even *more* strongly. This is the so-called "Backfire Effect." It puts evidence-based proponents in a bit of a bind.

But Scott notes the effect is not universal. "No one is saying don't correct misinformation. No one is saying information doesn't count."

What to do?

Debates about opinions are healthy. But realize that our opinions are determined not only by facts but by values and ideology. Keep stressing that scientific facts are not opinion. Communications research tells us that to change minds we need not only the facts but better and more effective messages, repeated often. Have a strategy in our communications with others. Realize opponents aren't stupid or ignorant. They are operating from a position of strongly held ideology, values, and group identity—as are we all.

"Talk to each other. Treat others respectfully. ... We can change our minds sometimes," she says. Do so and "there is a chance the science will be heard."

And that's all from me. We'll next give you some of Paul Fidalgo's "live" short personal takes on CSICon talks. More still can be found on CFI's website. Trigger warning: If you don't like irreverent humor, stop reading now!

Kendrick Frazier is editor of the Skeptical Inquirer.

Science Moms panelists Alison Bernstein, Layla Katiraee, Natalie Newell, Jenny Splitter, and Kavin Senapathy.

Short Takes from CSICon 2017

Center for Inquiry (CFI) Communications Director Paul Fidalgo covered CSICon 2017 "live" for CFI Live in a series of brief reports on CFI's website. Here are a few selections. (For others, go to centerforinquiry.live/2017.)

PAUL FIDALGO

Rob Brotherton on Conspiracy Theories

So, my help was suddenly needed at the CSICon AV station for the presentation by Rob Brotherton, author of *Suspicious Minds: Why We Believe Conspiracy Theories*, so I didn't take notes about his talk, and instead pressed a button to switch camera angles for the video recording.

Luckily, it was a really compelling talk that I think I retained a great deal of.

So, why do people believe in absurd conspiracy theories such as the faked moon landing or the shadowy network of plotters behind the Kennedy assassination? It helps to think about it in terms of people's perceptions of agency and intent.

Generally, if a person is more inclined to ascribe intent to ambiguous scenarios, they are also more likely to be conspiracy theorists. If you hear "he burned down the house," and assume it means he burned it down out of malicious pyromania or insurance fraud, you're a conspiracy theorist. If you presume the statement means it was an accident related to a toaster or dropped cigarette, you're less likely to be an Alex Jones fan (my words).

Also, if something important happens that has a major impact, it's difficult for many people to believe that they have a simple explanation. But Brotherton showed that with many major events that were almost world-shaking, but turned out not to be, the simple explanations seem to pass muster with everyone. JFK was killed, changing the course of history, so the lone-gunman story didn't make sense to conspiracy theorists. Ronald Reagan was shot, but survived, meaning normality was restored, and there are today no serious Reagan-shooting conspiracy theories.

There was also a thing about some black and white animated geometric shapes fighting with each other, which was cool, but I was thinking too hard about the button I had to press at the time.

Well, let me tell you, if you didn't see it here in person, when the video goes up at some point in the medium to distant future, you're going to love it. Especially the camera switching, which was nothing short of inspired.

David Gorski: Quackery, Limitless in Abundance

What on Earth is going on in academic medicine? From David Gorski's presentation, I learned that an association of schools with fake-medicine facilities exists; the Academic Consortium of Integrative Medicine has over seventy member academic medical centers, up from only eight in 1999.

Gorski (an oncologist at the Barbra Ann Karmanos Cancer Institute and a CSI fellow) recounted a long list of deeply troubling developments in "quackademic medicine," such as the recent $200 million gift to UC Irvine for the construction of an integrative medicine research facility, Harvard students learning about meridians from an acupuncturist, and the Cleveland Clinic's wide array of offenses against science, which includes nonsense treatments such as reiki.

Reiki. Man, that's a real humdinger, that one. The Cleveland Clinic's website boasted that reiki involves a "universal life force that is limitless in abundance." As Gorski clarifies, "Reiki is just faith healing with Eastern mystic religious beliefs."

It's maddening. So many resources and so much time and energy directed toward these unscientific nondisciplines. Those $200 million could certainly be better used to pursue real medical breakthroughs rather than making the supporters of homeopathy feel validated.

Part of the problem is how the quackademics muddle their claims with science-sounding terms, layering it all with heaping dollops of self-righteousness. Alt-med, CAM, integrative medicine, functional medicine—all of these in one form or another assert that they "treat the whole person," exclusively "treat the root cause of disease, not just symptoms," and that only they emphasize prevention of diseases (which is a surprise to real doctors). But it's okay, because these alt-med types are using "the best of both worlds." This leads Gorski to ask, "How can you use the 'best' of quackery?"

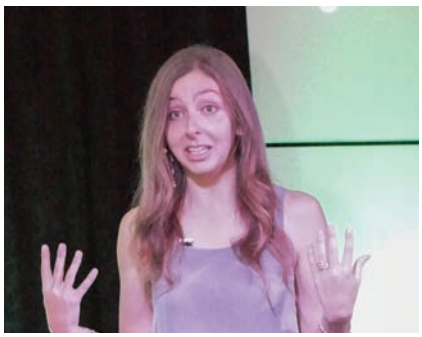
Clearly, though, the reality-based community and the champions of integrative medicine are having different conversations. If you doubt that, note that Dr. David Katz insists that homeopathy works and that medical science needs to embrace "a more fluid concept of evidence."

If your head has exploded over this, perhaps you'd like to check in with the Cleveland Clinic and see if your unlimited life force energy can heal your freshly detonated skull.

Maria Konnikova and the Luck Delusion

Later in the evening, I handed CSI's far-too-heavy and frankly dangerous Balles Prize in Critical Thinking to Maria Konnikova, the *New Yorker* writer and author of books including *The Confidence Game* and an upcoming book on poker. (She tells me not to worry about the weight of the award; she does yoga.)

I mention this because at the top of her presentation, Konnikova asked the audience whether we feel that we are "lucky." A good chunk of folks raised their hands to say yes, they're lucky. By far the most indicated that they do not believe themselves to be lucky or unlucky (they're skeptics, after all), and when she asked who thinks they are unlucky, I was (as far as I could tell) the lone hand to pop up—and rather enthusiastically. (I should clarify that this is my shtick. I'm actually astoundingly lucky in countless ways, but I kind of do this Charlie Brown-esque everything's-terrible thing as part of my persona and various pathologies. So it was mostly performative.)



"You and I will need to talk, sir," Konnikova said to me from the stage with a wry smile, not knowing at the time that I would be her award presenter. Because I'm human, I found this charming collection of interactions, within this context, to be, well, what … lucky? Something like that.

Which of course it wasn't, not in the sense of some mystical force called "luck" ensuring that I had a somewhat humorously ironic connection with Konnikova. It was just a thing that happened.

Here's what's really lucky. "Out of all the potential people that could have been born, you were born," she told us. "You are here. And that is awesome." It's not mystical, but it is kind of a big deal. It's a big deal and it was out of our control, so whatever "luck" brought us into being evaporated as soon as we began existence. But in other aspects of our lives, we operate under the illusion of control, which Konnikova exemplified by citing a study involving coin-flip predictions, where subjects really believed that they could "practice" and "get better" at guessing heads or tails—which is of course nonsense yet feels real to people.

This manifests in the gambling world, in which Konnikova has spent a year of her life to research her new book, in two key fallacies: One is the Gambler's Fallacy, where people believe that some outcome of a game of chance is "due" to occur for whatever reason, which of course it isn't. The other is the Hot Hand Fallacy, where a player or a team will believe they have some injection of luck pushing them through a string of successes. That one's more complicated.

Konnikova says that generally, "Chance is random; it really doesn't care what's already happened. At all." The Hot Hand Fallacy only shows little signs of validity because of psychology. In a competitive sport, greater confidence can improve a player's performance or maybe intimidate the opponent, increasing the chances for additional success.

What's the lesson of all this? Just sneer at folks who believe in luck? Hell no. "Shit happens," Konnikova says, and it's something we need to just accept. We need to embrace the confidence and happiness we get when *good* shit happens, acknowledge that bad shit will also happen, and simply make the most of all of it.

"Thinking about luck in this way will make us better players at life," she said.

Okay, okay. I'll try.

Joe Schwarcz,
Your Friendly Neighborhood Skeptic

There was something about Joe Schwarcz that I couldn't quite put my finger on as I watched his presentation, in which he recounted some highlights from his career as a science communicator spanning four decades. Schwarcz, a chemist and CSI fellow, is director of McGill University's Office of Science and Society.

The man is delightful. So grounded, and yet so light. As he told his stories, smiling almost the whole time, it felt like I was being led down familiar memories with a familiar friend, even though all of this was new to me. The word *avuncular* is the one that keeps coming to me. (Side note, Schwarcz was able to take credit for the rise of Canada's Superhero Prime Minister Justin Trudeau, because a school-aged Trudeau once saw Schwarcz give a science presentation. Q.E.D.)

I'll get back to all that in a bit. The content of Schwarcz's presentation was grounded in the simple truth that "there are no bad chemicals, only safe or dangerous ways to use them." He laid out the context in which chemistry, and much of science more broadly, is seen as something nefarious and in which "chemicals" are inherently evil things that need to be reduced or removed as much as possible from all aspects of our lives.

And one of the things that Schwarcz is trying to do is to put a spotlight on how a lack of understanding of science and chemistry sets the stage for people to be duped and ripped off. (He showed an honest-to-goodness product called "dehydrated water," which instructed the consumer to add it to cold water and stir.) If people are afraid of chemicals as a concept or ignorant of basic science, then they can be sold on useless products or even drive themselves crazy with the futile avoidance of chemicals.

On his Montreal-based radio show, Schwarcz deals with this confusion about science all the time. (It's the world's longest-running radio show about chemistry *and* the *only* radio show about chemistry, he boasted.) Like *Car Talk* for chemicals, Dr. Frasier Crane for everyday science. He helps regular people lose some of their fears and gain valuable tools for navigating a world in which the messages about chemicals and science are distressingly inconsistent, to say the least.

And it's the idea that he's sort of the friendly neighborhood skeptic that I think was on my mind as I watched and listened to him for the first time. He's the guy you'd want to bring your questions to, because you'd feel stupid bringing it to someone else, and you know he's going to do his best to help in a friendly way. That's different from being someone like a super-celebrity scientist such as Neil deGrasse Tyson or a hard core academic. It's like Joe is from the neighborhood. And I think that's incredibly valuable.

"Does any of this matter?" Schwarcz asked about his many years of work. Yeah, it matters.

Ross Blocher:
Absorb the Dumb, Plant the Seed

Maybe it's just a hobbyhorse of mine, but I've seen enough haughty skepticism that revels in "being right" rather than making things better for everyone. So when I'm exposed to new ways to approach skeptical activism that aren't purely about hostility, conflict, and fist-shaking, I'm intrigued. Even more so if it's an overtly compassionate approach.

One model for me is the Joe Nickell approach, which I can broadly summarize as one in which each extraordinary claim is taken on its merits. Joe doesn't look to "debunk" a ghost sighting, for example, and prove the poor fools wrong; rather, he investigates. He takes each new claim as a puzzle to solve not as an opportunity to ridicule someone who believed something that wasn't so.

The approach of Ross Blocher and Carrie Poppy in their *Oh No! Ross and Carrie* podcast is related to Joe's, but rather than investigate individual instances, they enter into the worlds of these believers open to the experiences they offer, and they bring their observations back to us.

"We are excited by people's beliefs," said Blocher in his presentation, showing us a number of examples of his and Poppy's adventures in the worlds of Scientology, Raelianism, mystical cancer cures, coal walkers, and on and on. In each immersion, they use their real names, have real conversations, and seek not to debunk claims but to evaluate an experience. They don't even really use the word *skepticism* in their show, even though that's exactly what they're practicing.

Blocher told us that we need more people taking this kind of approach, and I agree. The Blocher-Poppy theory is aimed at avoiding anger and hostility in favor of "planting a seed." Rather than getting into a conflict and merely trading bad feelings, you "absorb the dumb," take in the presumably bad ideas, and remain open while you learn more. The effect is often very positive. "A lot of people are jerks about this," Blocher says believers will tell him, "but you're someone I can talk to."

There's the seed. Now there's a little more space to learn and maybe even change a mind. I dig that.

Kevin Folta:
Share the Truth, Defend the Truth Tellers

Kevin Folta needs you to be a part of an army of Johnny and Janie Appleseeds, except the seeds you drop will be remarkably resilient to pests, remove allergens, and help alleviate starvation in developing countries.

When you listen to Kevin Folta, a professor of horticulture at the University of Florida, you can't help but find yourself with very big feelings about things such as gene editing and vitamin A. You see, it's so easy for cutting edge genetic science to be distorted and demonized. It's unfamiliar territory; it's complex, and it reminds people of creepy sci-fi scenarios. But Folta gives the science—and more important, the drive to advance that science—a human face and voice.

And that voice sometimes strains around sudden surges of emotion, sparked by his descriptions of the effort to use gene editing to protect and improve staple crops that can keep people alive and prevent diseases, only to have those efforts blocked by anti-GMO activists.

They're not just a nuisance. Folta says the grassroots efforts in the United States to stop genetic modification of food also changes the attitudes of those on whose behalf the work is being done. We know too well the mistrust that people in many parts of the developing world have for the United States, and the campaigns to stop gene editing and other innovations can turn the beneficiaries against the very thing that is intended to save them.

Folta is deeply affected by this dynamic, frustrating to no end, especially considering the good that could be done for children who are malnourished. But it's also personal for him, having been the prime target of an anti-GMO propaganda effort to discredit him, resulting in, among other things, a damaging *New York Times* piece for which he was asked what it felt like "to be a tool" of the agriculture industry.

But he says he got through it because of this community, people like us. When academics were too spooked to rise to occasion, it was the skeptic movement that stepped up and pushed back. And this, says Folta, shows the best of what this movement can do. "The science and skepticism audience can really make a difference here," he said, by doing what we do best: sharing the truths that science tells us and defending those who tell the truth.

And we're needed. Folta described the example of a young post-doc colleague of his who works with birds, who PETA has tried to bully and harass. It represents a cynical new tack, says Folta. "They're going after early career females with families," knowing that they are particularly vulnerable to being pushed out of their work. So Folta wants us to be part of the solution, to resist the bullying, and, most importantly, to share the truth. "Science," he insists, still holding back some tears, "can win."

Everybody Plots All the Time!
Taner Edis on Misinformation Outside the United States

Taner Edis gave a remarkably compelling and sobering talk on how an advanced, modern society can find itself in thrall to conservative religious politics, baseless medical treatments, the institutional embrace of pseudoscience, the diminishment of secular expertise, and an embrace of conspiracy thinking and creationism.

I am of course talking about Turkey, not the United States.

Edis, a physicist, used Turkey as his prime example for how a culture can become hostile to science, and the pieces of Turkey's puzzle looked a lot like ours. As George Hrab remarked at the end of Edis's talk, "It's beautiful how human beings are the same everywhere, and it's also really sad that human beings are the same everywhere."

Some examples: Culture wars in the 1970s in Turkey laid the groundwork for a rise in creationist thinking and its inculcation into institutions. Once officially secular, conservative religiosity is now the rule in Turkey, as concepts such as evolution are excised from the educational system. All this time, the government has become ever more secretive. Creationism itself is marketed in a modern and media-savvy way,

dressed up almost like a Tony Robbins-esque path to success as much as a theology.

Meanwhile, the public doesn't trust anyone, especially "experts" and elites, and identifies with conspiracy theories—yes, even about 9/11. Edis said the popular attitude boiled down to "Everybody plots all the time!" You get the point: The names are different (usually), and the degrees of impact that each factor contributes vary, but the fundamentals are there.

So one key point from Edis's presentation was that we can take lessons for skeptical activism by observing the similarities and differences among nations and cultures as they lean toward or away from hostility toward science and the embrace of woo. We need to look more closely at the role the media and corporations play in advancing antiscientific thinking and what they have to gain.

So hey! It's not just us, everybody! But, uh oh. It's not just us.

Teresa Giménez Barbat: Skepticism in the Heart of Europe

Teresa Giménez Barbat of Barcelona is a member of the European Parliament, and before the attendees of CSICon 2017 she positioned herself squarely as an ally and advocate for skepticism and secularism. Her job, she said, is "to make skepticism and secularism heard in the heart of Europe."

While the issues she works on would certainly be familiar to us in the United States, it is telling that one of the more absurd examples of what she calls "homeopathic laws"—laws that are well intentioned but have no real benefit—include the bizarre regulation dictating the curvature of cucumbers.

There are instances of dangerous science denial, of course, though according to Barbat it can come in forms that are sort of chimeras of American issues. For example, she's dealt with those who blame global warming on "patriarchal attitudes." Well, I could see a case for that, but of course the point is that it's an avoidance of the plain physical causes of climate change.

And, with an issue that is right at the heart of CFI's international efforts, Barbat discussed how she advocates for the rights of those accused of apostasy and blasphemy in countries such as Pakistan. She revealed how she had not always been a skeptic, with a nominally Catholic childhood followed by a young adulthood in which she confessed to being "an annoying and insufferable hippie." It takes courage to admit that.

A Real Human Being Named James Randi

James "The Amazing" Randi couldn't be at CSICon as planned because of a small stroke, and of course it's disappointing. But to sate the skeptic appetite for amazingness, Massimo Polidoro, the Italian investigator and Skeptical Inquirer columnist who is writing a biography of Randi, recounted some of Randi's greatest feats from generations ago.

It'd be pointless for me to recount them for you here, especially since I can't write in a sufficiently charming Italian accent. But I did come away from this presentation with a new appreciation of Randi and his legacy.

The stories made Randi out to be less of a legend and more of a man who was driven and devoted to the details. The ways he escaped prison cells or humiliated charlatans weren't done off the cuff. He didn't take any frauds down by critically block-quoting their blog posts. He planned and prepared with the kind of meticulousness that is hard to imagine.

But look, if you care deeply enough about something, such as the truth, the effort is so worth it. It's easy to conceive of Randi as a kind of secular wizard. I'm happy to think of him as a guy who has worked incredibly hard and cared a hell of a lot .

CSICon 2017 attendees pose in Randi-like beards for this special photo, which was then sent to James Randi, who was recuperating at home following a small stroke.
Photo organized by Susan Gerbic assisted by Brian Engler, Ross Blocher, and Jim Underdown.

LEAVE *a* LEGACY *of* REASON

Imagine a future where science and reason serve as the foundation for our lives.

A future where free expression is guaranteed everywhere around the world.

A future where old sectarian divisions have been overcome by the common bond of secular ideals.

This is the future CFI is working toward. Together, we can achieve it. It's never too early to consider a planned gift—*a legacy of reason*.

Call today to reserve your copy of our new gift-planning brochure—a helpful guide through the many options available to you.

Then speak to your trusted financial advisor or attorney. It's as simple as that.

IT'S EASY

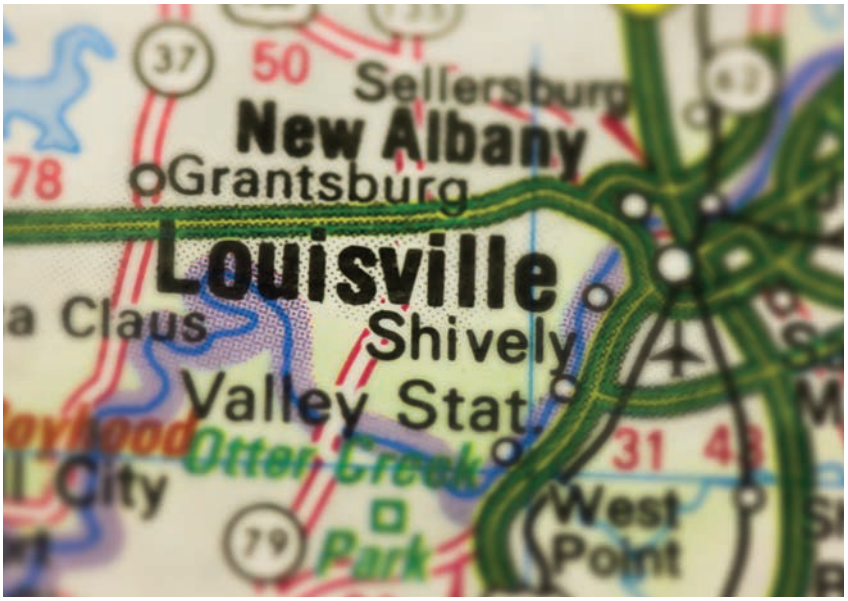
Call **Martina Fern** today at **1-800-818-7071 x426** for your copy of this valuable information, or e-mail her at **mfern@centerforinquiry.net.** There's no obligation.

Joe Nickell, PhD, is CSI's senior research fellow. A former magician, private investigator, and scholar, he is author of numerous investigative books, including *The Science of Ghosts*.

Hawking 'Ghosts' in Old Louisville

David Dominé is author of a series of three books (2017a; 2017b; 2017c) offering, in turn, "Ghosts"—and "Phantoms" and "Haunts"—"of Old Louisville." Do they indeed present "True Stories of Hauntings" and even "the possibility of supernatural phenomena" (as the publisher suggests in book-jacket blurbs)? Dominé asks, "Do I believe human beings experience strange phenomena that cannot be explained away by science and coincidence?" He answers: "Most assuredly. I have experienced activities myself that—apart from sheer imagination or happenstance—could only be attributed to something beyond ordinary human understanding."

Then again, in one of the most self-contradictory prefaces I have seen, he talks out of the other side of his mouth, stating that his "stories" are "for entertainment purposes only." Indeed, "Don't ask me to justify my accounts of hauntings in this book, and don't tell me that you don't believe in the supernatural, because—truth be told—I don't care." Yet again, he states, "I just want to present a story that defies explanation." Yet he habitually treats the "unexplained" as evidence of the paranormal—a form of faulty logic called "an argument from ignorance" (Dominé 2017c, 6–10; Nickell 2012, 269).



In one of the most self-contradictory prefaces I have seen, David Dominé then talks out of the other side of his mouth, stating that his "stories" are "for entertainment purposes only."

But let us take a look at some of Dominé's intentionally spine-tingling accounts—keeping in mind that he often changes the names of his informants and admittedly uses "artistic license" to improve the narratives (2017a, 7). One gets the impression he does not even want the tales to be examinable.

Specter of Light

In Dominé's very first offering, a man left work at the historical society after an exhausting fourteen hours. He was so tired that he skipped his usual walk and got into his car

parked in front of a church. Laying his head back on the seat rest, he soon "noticed a strange light" that he then perceived as "a beautiful woman." He would later recall her outdated hair and clothing in remarkable detail. Although he sensed she was otherworldly, the vision seemed real. As she reached the bottom of the stairs, he was overwhelmed by a sense of sadness she projected, and then she vanished. He thought he might have imagined her but decided otherwise (Dominé 2017a, 17–31).

The ghostly vision is, in fact, a textbook example of a "waking dream"—known scientifically as a hypnagogic experience (Mavromatis 1987). It occurs in the state between being fully awake and asleep, and it has features of both. The subject's extreme tiredness is telling, along with the strange imagery. A common aspect of hypnagogia is suggestibility, and the subject's prior hours of immersion in history may have been a factor, as may have been an apparent local legend of "the Lady of the Stairs." Invariably, those having a waking dream insist on the reality of their experience (Baker and Nickell 1992, 130, 226–227).

Demonry?

In the 1940s, a young World War II veteran had a series of bizarre experiences in his apartment in the old women's infirmary on South Sixth Street. Nothing happened for the first three months he lived there, but then enough hell broke loose for him to summon a priest. The events began one night when he was tired and ready for bed. As he brushed his teeth, he heard music from the radio and, thinking he had misremembered turning it off, he checked—only to find it *was* turned off. He still heard music, even when he pulled the plug from the outlet, and he heard "the apparent hiss and crackle of static." He also had an experience with a lamp that he could not turn off. Lying in bed he heard moaning and sobbing but, oddly, did not get up to investigate. Such experiences plagued him for weeks—always at night—and on occasion he saw both the radio and lamp levitate before him while a fog gathered. On one occasion, "Immobilized, he stared at the objects in the air before him and gulped for air, afraid he might suffocate. …" And then the spell subsided. The events continued even when the priest came to exorcise the demonry, though he was "apparently unperturbed" during the moaning and gathering fog.

The ghostly vision is, in fact, a textbook example of a "waking dream"—known scientifically as a hypnagogic experience. It occurs in the state between being fully awake and asleep, and it has features of both.

Finally, normalcy returned, and the man lived on there without incident for nearly two years (Dominé 2017a, 75–86).

The subject's bizarre experiences have numerous features in common with hypnagogia: the tiredness, the elements of mist and luminosity together with auditory effects (including music and "crackling and snapping noises") and visions (which can be of great variety and include the movement of inanimate objects); one notes also the onset of sleep paralysis (he was "immobilized" and felt he "might suffocate"), a corroborative factor. (The inability to move is due to the body being in the sleep mode.) Taken together, the effects indicate a series of hypnagogic experiences (Mavromatis 1987, 14–35, 81; Baker and Nickell 1992, 130, 226–27; Nickell 2012, 352–354). I suspect the priest (who reportedly shared one vision) humored the subject, as has been done in untold cases.

Disembodied Footsteps

One night early on, Dominé high-tailed it out of his own abode, the historical Widmer House, when he encountered—well, what *were* those creaking sounds? They seemed to him like the footsteps of "an invisible visitor"—there on the old steps ("*Someone is coming down the stairs!*"), and then beside the bed where he lay with his two miniature schnauzers: at once "a loud groan from the floorboards," then "a long moaning squeak that ended with a loud pop." Soon—the tension mounted—the sound came from the other side of the bed, and, he says, "I literally flew out of bed." Well, he doesn't mean literally "literally," but he and the two dogs—i.e., three scaredy cats—were out of there in a trice (Dominé 2017a, 34–47).

Dominé is at pains to convince us his place is haunted, even while maintaining he is "hopeful that something logical would explain the weird noises." He reports asking his workmen if their recent sanding of the floors or the warmer weather might be responsible, but they were rather skeptical. In fact, old houses, especially, can creak and pop, due either to settling of the structure or to the fact that wood frame houses expand and contract when the temperature changes—becoming cooler for example during the night, just as he experienced (Holton 2014). Settling of the house might well be suggested by other phenomena there: occasional loud noises, plaster dropping from the ceiling, and pictures falling off the walls (Dominé 2017a, 37–38).

At a Séance

Dominé seems especially unprepared when an alleged spiritualist medium invites him to midnight séances at the old Spalding Mansion. Calling herself "Amber" but declining to give a surname, she seated Dominé and others at a large table in the dining room illuminated only by a flickering candle. After various blessings and an invocation to her "spirit guide," she placed on the table a small vase into which was stuck a white feather

somewhat taller than its container. As she asked questions of some alleged spirit, the feather rose, hovered, and fell to indicate *yes*, remaining motionless for *no*. Laboriously, by beginning with the letter *A* and proceeding letter by letter through the alphabet, the entity could also spell out words, including its name: once that of a possible house owner, another time the words, "MY NAME IS DARKNESS." On one occasion the plume sailed up and out of the vase! Still, without mentioning the possibility of trickery, Dominé states he had "seen enough" and would simply chalk up the strange happenings to "the unknown."

Dominé is at pains to convince us his place is haunted, even while maintaining he is "hopeful that something logical would explain the weird noises."

How convenient. In fact, séance tricks have been common throughout the history of spiritualism, especially wherever dark rooms were used. The mystic-feather feat is easily accomplished with the aid of what magicians call an invisible thread. Indeed, corroboratively, when the medium's feather once leapt from the vase it "landed on the table in front of her" (not to the left or right or away from her), just as if it had been *pulled* in her direction (Dominé 2017b, 21–41). Using my magician's background and extensive study of spiritualist methods (including sitting in many séances, often undercover), I have exposed fake "spirit precipitations" (images supposedly materialized on cloth), billet readings, and many other mediumistic phenomena (Nickell 2012, 94, 217–218, 219–221, 287–290).

Ghost Hunting

We are treated several times to the antics of so-called ghost hunters, who employ various gadgets on the supposition that they detect ghosts. That involves finding electromagnetic energy (supposedly somehow connected with ghosts), or taking photos (sometimes, for instance, showing "orbs"), or recording ghostly murmurings called "electronic voice phenomena" (or EVP), and so on. Some utilize "psychics," who report their feelings or visions or who employ dowsing rods or other means to "communicate" with spirits (e.g., Dominé 2017a, 171, 179–182; 2017b, 110–111, 141–143; 2017c, 126–127, 144–145).

In fact, none of these methods has ever proven to have detected a single ghost. Sources for electromagnetic fields, for example, are as ubiquitous as faulty electrical wiring, radio waves, microwave emissions, solar activity, electrical thunderstorms, and many other influences, including the hapless seekers' own electronic equipment! EVP "voices" typically represent the tendency to hear apparent words in random sounds, such as background noise, or perhaps unrecalled actual voices of the crew. (Other alleged phenomena, including "orbs," are discussed in the next two sections.) Much "ghost" activity is attributable to pranks and—deliberately or inadvertently—to ghost hunters themselves (Nickell 2012, 146, 259–280, 309–312).

Mystic Motions

One of Dominé's informants discovered that a ghost had twice made her bed for her! Oh, sure, she first thought it was her roommate, Sarah, but then the two consulted spirits via Ouija board. When they asked who made the bed, the pointer spelled "I D-I-D"—not S-A-R-A-H as expected (2017a, 100–101). Surely Sarah would not play pranks! Besides, a local "psychic" at another "haunted" abode was reportedly able to detect "spirit energy" using a pendulum. The psychic employed it, she said, "to measure the energy around us." Dominé gushes, "Suddenly, the suspended object seemed to start swinging on its own, back and forth, and then around in long, lazy arcs." "Oh yes," said the psychic, "there's a lot of good energy here" (2017b, 63–65). Some psychics use a pendulum to supposedly communicate with a ghost, using specified movements to answer "yes" or "no."

Such mystical motions—when they are not deliberate—are known to be caused by the psychological phenomenon called the "ideomotor effect": when one concentrates on an expected movement, unconsciously the muscular system carries out the action. This explains the movement of the Ouija planchette, the swinging of dowsing rods and pendulums, and the activity of the once-popular spirit phenomenon known as "table tipping." The noted British physicist Michael Faraday explained the latter phenomenon in 1853 using simple experiments (Christopher 1970, 115–123). When knowledgeable investigators use proper safeguards to eliminate the ideomotor effect with the Ouija board, for example—say, when the operator is properly blindfolded—"only gibberish is produced" (Randi 1995, 169–170).

Fauxto Ghosts

Ever looking for "ghost" phenomena, Dominé thinks he may have seen—and in some instances made—photos of ghosts. In *Ghosts of Old Louisville*, he describes a photo with "what appeared to be the shadowy figures of a young child leaning forward on the window sill and an old woman in a nightgown standing behind." His friends could see them too (2017a, 174–175), but what is really mysterious is that he does not print the picture for *us* to see. He does show four snapshots from a couple's New Year's Day parties containing strange bright, blurry shapes that impressed a "psychic" and two photo "experts" who could not explain them (2017a, 170–177). Again, he himself captured what are known in ghost-hunter parlance as "orbs": "Many believe them to be actual ghosts or spirits in the spherical forms of light" (2017c, 144–145).

Actually, the "shadowy figures" described in the first photo are consistent with *simulacra*—the result of one's ability to perceive images in random

shapes (like seeing pictures in clouds or inkblots). Known as *pareidolia*, this is a neurological-psychological phenomenon by which the brain interprets vague images as specific ones—commonly as people (such as the "man in the moon"). The second phenomenon—the blurred, whitish shapes—result from the camera's flash rebounding off some intruding object—commonly part of the photographer's hand or, in these instances, the bunched camera strap (I can even make out the scalloped edge of the braiding). As to the "orbs," they result from particulate matter in the air (dust, lint, water droplets) being close to the lens and bouncing back the flash (much as the camera strap did). I have made many of these in both still photos and videos, even creating and observing and photographing the effect in progress (Nickell 2012, 351, 128–129, 301–306).

Poltergeists

The poltergeist (German for "noisy spirit") is alleged to cause various ghostly—if usually mischievous—disturbances. Just such a pranking specter—dubbed "Sally"—is said to haunt the old Ferguson Mansion (home to the Filson Historical Society.) The phenomena attributed to a resident poltergeist include books that unaccountably fall from shelves—usually singly and when someone walks by. However, a researcher reportedly saw a book that "hovered in the air" before falling, followed by another and another until the shelf was emptied. Again, "a huge letter S" was discovered, laid out on a rug in the center of a room with books "from the surrounding shelves." And once, into a researcher's unattended notebook, the presumed poltergeist's autograph appeared: "In an elegant, flowing script, Dominé tells us, "a feminine hand had written the name SALLY." (Dominé 2017c, 21–37). Do we need more proof than this?

We do. First of all, books fall from shelves due not to spirits but to gravity. If books are placed carelessly, or if an old building settles, or if someone depresses a floorboard walking by, a book may tumble—or books, considering the domino effect. (In the case of the "hovering" book, it was seen by an impressionable researcher who had often had "creepy" feelings there. (She had worked late and "felt a sensation of pressure" in her chest—indicating the possible onset of sleep paralysis.) However, the "S" of books and the penned spirit autograph do indicate deliberate pranking. Many famous poltergeists have turned out to be human mischief makers—children or immature adults—plaguing credulous adults. I have caught several of these (Nickell 2012, 294–295, 319–341). Indeed, the researcher's response to the spirit autograph was "to wonder if someone hadn't been pranking me." As she reasoned, "Maybe one of the employees wanted to perpetuate the legends of the ghost named Sally on the premises" (Dominé 2017c, 35).

* * *

How could a press that represents all of the universities in the Commonwealth of Kentucky publish such nonsense—even in an age of fake news and fake science?

The foregoing examples show how Dominé's books foster ignorance and superstition. Moreover, they pay only occasional lip service to science while at times promoting noxious pseudoscience—and even reveal an antiscience bias. Dominé appears not to understand why science dismisses the existence of ghosts, treating the matter as one of belief versus disbelief: "To my mind," he says, "only arrogance and lack of faith in one's own convictions could lead so-called rational beings to discount all phenomena outside their belief systems" (Dominé 2017c, 7). But it is Dominé who is arrogant. Only someone supremely ignorant of science could make such a statement.

And how could a press that represents all of the universities in the Commonwealth of Kentucky publish such nonsense—even in an age of fake news and fake science? I suspect the motive was money (at the expense of ethics and science) that led to republishing the author's previously published books. (They were apparently not even read by an editor so as to remove errors like "lead" for *led*, "aide" for *aid*, "queue" for *cue*, and so on, including—ironically in reference to a container of holy water—"vile" for *vial*.)

As Dominé and his press should learn, science cannot substantiate the existence of a "life energy" that could survive death *without dissipating* or function at all *without a brain*. Besides, even if such an energy did exist, and perfectly retained the form of the person it inhabited (being sometimes reported as visible), why would *inanimate* objects such as clothes survive as well? If the imagined energy were such that "ghosts" could glide noiselessly through walls, then why do they at other times have such heavy footfalls? The answer is that ghosts behave in apparitional dramas just as they do in dreams, memories, and imaginings, because they too are mental creations. They are evidence—not of another world, but of this real and natural one.

References

Baker, Robert A., and Joe Nickell. 1992. *Missing Pieces: How to Investigate Ghosts, UFOs, Psychics, & Other Mysteries*. Amherst, NY: Prometheus Books.

Christopher, Milbourne. 1970. *ESP, Seers & Psychics*. New York: Thomas Y. Crowell Co.

Dominé, David. 2017a. *Ghosts of Old Louisville*. Lexington: UP of KY.

———. 2017b. *Phantoms of Old Louisville*. Lexington: UP of KY.

———. 2017c. *Haunts of Old Louisville*. Lexington: UP of KY.

Holton, Peter. 2014. What to do when your house makes cracking sounds. *Boston Globe* (June 29).

Mavromatis, Andreas. 1987. *Hypnagogia*. New York: Routledge & Kegan Paul.

Nickell, Joe. 2012. *The Science of Ghosts*. Amherst, NY: Prometheus Books.

Randi, James. 1995. *The Supernatural A–Z*. London: Brockhampton Press.

MATTHEW NISBET

Matthew Nisbet is professor of communication at Northeastern University and a Committee for Skeptical Inquiry scientific consultant. From 1997 to 1999, he was public relations director for CSI.

Ambassadors for Science

Harnessing the Power of Opinion-Leaders across Communities

Last year my wife and I bought our first home, in a Massachusetts town north of Boston. When we moved to the town, we had no friends in the area or family members. If we were going to navigate the complexities of buying a home in an ultracompetitive and unfamiliar housing market, I knew that I was going to have to lean on a reliable source of advice. I needed to find what researchers who study social influence call an opinion-leader. As numerous studies have explored, opinion-leaders rarely hold formal positions of authority and instead prove influential by way of their greater attention to the news or a specialized topic, the knowledge they acquire, their strength of personality, and their experience in serving as a central go-between for shared information among their large network of friends and acquaintances (Nisbet and Kotcher 2009).

Luckily, soon after we moved to town, I met a key local opinion-leader in the form of our financial advisor. A native of the area with a gregarious personality, over several decades he had built up a diverse network of contacts. As it turns out, his advice on choosing a real estate agent and local bank to work with proved critical to our home buying process.

As familiar as this process of community networking might sound, until only very recently science communication–related initiatives have ignored opinion-leaders. Instead of defining communication as a networked process, science communication has traditionally been conceptualized as a one-way process of translation from experts directly to the public via lectures, media appearances, or popular books and articles. If there were an intermediary, science journalists were the go-betweens. This model of communication has always been flawed, but in today's polarized political culture and fragmented media system, such traditional approaches are likely to have limited reach and influence.

As numerous studies have explored, opinion-leaders rarely hold formal positions of authority and instead prove influential by way of their greater attention to the news or a specialized topic.

First, only about one in five Americans today are active consumers of science news, seeking out and using science news several times a week. With many alternative media options to choose from via TV, online, or their mobile devices, it is easy for those without an interest in science to avoid almost any news about the subject. Some people may incidentally bump into posts about science shared via Facebook or other social media platforms. But our social media feeds are also increasingly tailored by way of algorithms to our preferences and interests, making such incidental exposure less likely. Given recent debates over "fake news" and the spread of false information, most Americans now also say they distrust science posts they see via social media (Nisbet 2018; Pew 2017). Second, all of us tend to interpret debates over issues such as evolution, climate change, genetically modified food, or vaccination by way of our social, religious, and political identities. Our identities serve as powerful filters of scientific evidence. We selectively interpret arguments we encounter in the news to be consistent with our sense of what others who share our identity believe, following closely cues from trusted political leaders and media commentators (Nisbet 2016).

The tendency for Americans to rely on their social identity to make sense of complex issues limits the ability of scientists and their organizations to influence broader segments of the public. Surveys show that the scientific community—in comparison to the U.S. public at large—tends to be disproportionately white, male, liberal, and nonreligious (Pew 2015). Like most Americans, scientists tend to live, work, and socialize within social circles that

mirror their background, social identity, and religious beliefs. Scientists are therefore likely to have fewer friends and acquaintances who are from lower socio-economic backgrounds, are black or Latino, have a conservative ideological outlook, or are churchgoers, much less evangelical or born-again Christians. Scientists and their organizations must therefore collaborate with trusted opinion-leaders who can build bridges to groups that are difficult for scientists to reach and who can lead discussions at the community level of complex science topics in a way that is persuasive and personally relevant.

New and Old Approaches

In designing new initiatives that connect scientists with community-based opinion-leaders, one example to learn from is the Science & Engineering Ambassadors program. Sponsored by the U.S. National Academy of Sciences and the National Academy of Engineering, since 2012 the program has trained and supported close to forty scientists and engineers in the Pittsburgh, Pennsylvania, area. The goal of the program is to help local community members become more conversant with science-related topics, gain knowledge and skills in explaining science-related information to others, and improve their ability to assess the validity of others' claims and conclusions. To achieve this goal, scientists and engineers involved in the program specifically target in their outreach opinion-leaders living in the Pittsburgh area who can serve as valuable community-based go-betweens in spreading knowledge and information. These opinion-leaders span a variety of fields and sectors and include teachers, business leaders, attorneys, policymakers, neighborhood leaders, students, and media professionals. Drawing on principles from past research, the program seeks to engage those who "participate and have reach within the local community, as well as those who have a platform for disseminating knowledge and fostering community relationships" (National Academies 2012).

A second leading example is the "Science Booster Clubs" coordinated by the National Center for Science Education (NCSE) (n.d). In 2016 as part of a pilot program, NCSE recruited volunteers from communities across Iowa, training them in how to persuasively discuss with fellow Iowans topics related to climate science and evolution. These volunteers attended and presented at local public libraries, farmers markets, county fairs, and festivals, striking up thousands of conversations and engaging an estimated 54,000 people across the state during the first year of the pilot program. Key to the program's success was a partnership with the University of Iowa, which lent faculty and graduate student expertise to identifying and training volunteers and to evaluating and tracking the program's success. Since the launch of the Science Booster program in 2016, the initiative has now spread across multiple states.

As part of their professional lives and community interactions, readers can identify those individuals who appear to be key influencers and go-betweens and start to build a relationship with them.

As the role of the University of Iowa suggests, state universities should be central hubs for initiatives seeking to engage opinion-leaders and their communities. For decades, by way of their cooperative extension offices and staff, these universities have provided expert advice to state-wide professionals and stakeholders on farming practices, energy conservation, public health, fisheries, coastal resilience, forestry, land and water conservation, and other topics. This process involves not only consulting a state's residents about specific concerns, needs, and specialized knowledge, but also recruiting opinion-leaders and early adopters of best practices to influence their peers. In all, the diverse networks maintained by university-based cooperative extension offices offer tailor-made opportunities for scientists and their partners to engage in dialogue across diverse segments of the public about complex issues ranging from climate change to gene editing to science education (Prokopy et al. n.d.).

For readers who may be seeking a systematic way to identify and work with opinion leaders across groups, survey measures informed by several studies have been developed to reliably and validly identify individuals who hold opinion-leader traits. Shortened versions of these measures can be included in surveys of members of organizations or distributed among email lists and social media followers. Scores on these questions can then quickly identify those individuals who have strong opinion-leader–like traits (see Nisbet and Kotcher 2009). More informally, as part of their professional lives and community interactions, readers can identify those individuals who appear to be key influencers and go-betweens and start to build a relationship with them.

References

National Academies. 2012. Science and Engineering Ambassador Program Launches in Pittsburgh. Washington, DC. Available online at http://www8.nationalacademies.org/onpinews/newsitem.aspx?RecordID=05312012.

National Center for Science Education. n.d. Science Booster Clubs. Available online at https://ncse.com/scienceboosterclubs.

Nisbet, M.C. 2016. The science literacy paradox: Why really smart people often have the most biased opinions. Skeptical Inquirer 40(5): 21–23.

———. 2018. Divided expectations: Why we need a new dialogue about science, inequality, and society. Skeptical Inquirer 42(1): 18–19.

Nisbet, M.C., and J.E. Kotcher. 2009. A two step flow of influence? Opinion-leader campaigns on climate change. *Science Communication* 30(3): 328–354.

Pew Research Center. 2015. An Elaboration of AAAS' Scientists Views. Washington, DC: Pew Research Center.

———. 2017. Sciences New and Information. Washington, DC: Pew Research Center.

Prokopy, L., W. Bartels, G. Burniske, et al. n.d. Agricultural Extension and Climate Change Communication. Oxford Research Encyclopedia of Climate Science. Available online at http://climatescience.oxfordre.com/view/10.1093/acrefore/9780190228620.001.0001/acrefore-9780190228620-e-429.

Stuart Vyse is a psychologist and author of *Believing in Magic: The Psychology of Superstition*, which won the William James Book Award of the American Psychological Association. He is a fellow of the Committee for Skeptical Inquiry.

Do Superstitious Rituals Work?

Let us stipulate that there is no magic. Sleight-of-hand, deception, illusion, and conjuring, yes, but no "real" magic. On this, most science-minded people agree. But when it comes to superstition, there has always been an additional, less obvious question. Of course, superstitions do not have a magical effect on the world, but do they have psychological benefits? Could superstitions make difficult situations easier to handle? Furthermore, if they have an emotional or psychological benefit, could they also produce better performance in situations where skill is involved? The psychological benefits of superstitions—if they exist—would not be expected to change your luck at the roulette wheel, but perhaps an actor's pre-performance ritual could reduce anxiety, allowing for better acting.

Despite several decades of research on superstition, these questions remained unanswered for many years. Most researchers assumed superstitions were irrational and focused their attentions on discovering why people were superstitious. It was often assumed that there might be some direct psychological benefits of superstition, but these were rarely studied.

Then in 2010 there was a great advance—or so it seemed. Researchers at the University of Cologne in Germany conducted the now famous golf ball study (Damisch et al. 2010). Participants were given a putter and asked to hit a golf ball into a cup on the carpet of a laboratory. Half the participants were handed a ball and told, "This ball has been lucky today." The other half were told, "This is your ball." As it turned out, more than 80 percent of the German participants reported believing in the concept of good luck, and when the results were tallied, the researchers discovered that participants in the lucky ball group sank significantly more of their putts than the other group. Furthermore, Damisch et al. replicated this result with different tasks and several different luck-activating superstitions. Of course, there still was no magic, but these studies seemed to have demonstrated that believing in luck gave participants the confidence to perform better than they otherwise would. A phenomenon long speculated to be a possibility had finally been demonstrated in a laboratory setting.

San Francisco Giants third baseman Pablo Sandoval engages in a lengthy pre-batting ritual. (Source: Wikimedia)

Except there was a catch. As I reported in my January 2017 online column ("Your Unlearning Report: The Trouble with Empathy, Implicit Bias, and Believing in Luck," available at https://tinyurl.com/yc9nm8vu), a group of researchers at Dominion University in Illinois conducted a replication of the Damisch et al. study in 2014 and found no luck-enhancing effect on putting (Calin-Jageman and Caldwell 2014). Furthermore, the 2014 study included over three times as many golfers and was a pre-registered study—meaning that the design and methods of the study were publicly posted prior the start of data collection. The Dominion study was much more thorough and scientifically sound, and it came up empty. So, at least with respect to the effect of luck on putting performance, the jury is still out.

What about Rituals?

Some topics go unstudied for many years until someone comes up with a clever way to conduct the right kind of experiment. Such was the case when it came to rituals. The use of rituals in moments of trouble seems to be both timeless and universal. Consider the Jewish practice of sitting *shiva* and the lengthy mourning ritual that follows. On the surface, this and other rituals of burial and mourning appear to have a comforting value for the bereaved, but how would anyone test that hypothe-

sis? It would be unethical to create a similar loss in the laboratory, and even if you could overcome that obstacle, how would you choose the right ritual to use?

In 2014, two researchers at Harvard Business School—yes, Business School—found a way. Michael I. Norton and Francesca Gino (2014) did a series of experiments that looked at the role of rituals in coping with loss. To create a sense of loss, they invited people into the laboratory in groups of nine to fifteen and held a drawing for a $200 cash prize. The person who won the prize got to take the money and leave early, and the rest stayed for the coping-with-loss part of the experiment.

To look at the effect of rituals, Norton and Gino created an arbitrary ritual for people to perform in the lab. After losing the lottery, participants were each placed in a separate cubicle and told that "Previous research has found that people often engage in rituals after a loss." Then they were asked to follow the procedure below.

> Step 1: Please draw how you currently feel on the piece of paper on your desk for two minutes; Step 2. Please sprinkle a pinch of salt on the paper with your drawing; Step 3. Please tear up the piece of paper; Step 4. Now please count up to ten in your head five times; Step 5. You have now completed this task.

Other participants were given the same "Previous research has shown …" information about rituals but not asked to perform one. Still others were given a similar instruction: "Previous research has found that people often sit in silence after a loss" and were asked to sit in silence in their cubicles.

The primary findings of the research were that performing the ritual increased feelings of control and reduced the negative emotions of loss. Sitting quietly or simply being told that some people engage in rituals was not enough. Only actual performance of the ritual produced the effect.

Superstitious Rituals

Once Norton and Gino had paved the way on rituals and loss, it was not long before others adapted their procedures to other uses of rituals. Furthermore, Norton and Gino had pointed out that the ritual they devised involved tearing up a picture of "how you currently feel," a feature that gave the actions a kind of symbolic meaning. The implications for superstition and other performance enhancing rituals were not hard to see. The results with lucky golf balls had been murky, but if symbolic rituals were effective in coping with loss, perhaps they could be useful in other situations, too.

In 2016, Allison Wood Brooks, also of the Harvard Business School, along with colleagues from four other institutions, published a study called "Don't Stop Believing: Rituals Improve Performance by Decreasing Anxiety" (Brooks et al. 2016). Rather than create a situation of loss, Brooks and her colleagues brought people into the laboratory and confronted them with a number of potentially anxiety-provoking tasks: taking a difficult, timed math test or singing the song "Don't Stop Believing" by Journey in front of other participants.

Of course, superstitions do not have a magical effect on the world, but do they have psychological benefits?

Once the participants knew what they would have to do, Brooks and colleagues split people into ritual or non-ritual groups. Prior to the anxiety-provoking task, the ritual group performed a sequence of activities very similar to the one used by Norton and Gino in their 2014 study:

> Please do the following ritual: Draw a picture of how you are feeling right now. Sprinkle salt on your drawing. Count up to five out loud. Crinkle up your paper. Throw your paper in the trash.

In a series of experiments, Brooks et al. showed that participants who performed this ritual did better on the task—high-pressure math problems or singing—than those who did not. Furthermore, they were able to show that the effect was mediated by a reduction in anxiety. So performing a symbolic ritual prior to a high-anxiety task reduced anxiety, which in turn produced better performance. The experimenters tested a number of controls to determine what was behind this anxiety-reducing effect. For example, in both the Norton and Gino study and some of the Brooks et al. experiments, the ritual involved the participants drawing a picture of their current feelings, after which they would rip or crinkle it up and throw away the drawing. To determine whether this was an important part of the formula, Brooks et al. created a new sequence that removed the artistic expression of emotion and the symbolic destroying/discarding of the emotions:

> Please count out loud slowly up to 10 from 0, then count back down to 0. You should say each number out loud and write each number on the piece of paper in front of you as you say it. You may use the entire paper. Sprinkle salt on your paper. Crinkle up your paper. Throw your paper in the trash. (Brooks et al. 2016, p. 80)

For one group of participants, this new sequence was described as "random behaviors," and for another it was described as a "ritual." Finally, a third group did not perform the sequence of actions at all. The results showed that the ritual group had lower anxiety and performed significantly better on a timed math test than either the random behaviors group or the no ritual group. The authors suggested that merely calling the sequence a "ritual" was sufficient to give it the necessary symbolic function to reduce anxiety and increase performance. Brooks et al. did not find that participants had an increased sense of control, which was surprising because a desire for control has often been cited as a motivation for superstitious behavior (e.g., Hamerman and Johar 2013). Instead, the effect on performance was entirely due to reduced anxiety.

So What Does This All Mean?

Does this mean that superstitious rituals work? Yes and no. The Brooks et

al. study suggests that superstitious rituals do work—not because they are superstitious but because they are rituals. Any old ritual will do, including writing numbers on a piece of paper, crinkling it up, and throwing it away. But it appears to be important that the sequence of actions be defined as a ritual and not as random behaviors. So there is no real magic, but there is a bit of calming magic in performing a ritualistic sequence before attempting a high-pressure activity.

As a prelude to conducting the experiments in their study, Brooks and colleagues surveyed 400 people with the following question: "Think about a time when you faced a difficult task and you felt anxious about it (e.g., a test, a sport competition, an interview). Did you engage in a ritual before performing the task? (YES/NO)."

Forty-six percent of participants answered "yes." Interestingly, the rituals these people reported using were overwhelmingly nonreligious and absent of references to luck or superstition. When Brooks et al. went on to do their laboratory studies, they chose rituals that were not expressly superstitious, and yet the rituals "worked." The minimum amount of symbolism required was the "ritual" label. Furthermore, there is some evidence that rituals work even if you don't believe in them. In their study of rituals and loss, Norton and Gino (2014, Experiment 2) asked people if they had used rituals in the past and whether they believed "performing rituals influenced the way people feel (e.g., more calm, less sad)." Participants' responses to these questions were completely unrelated to whether the rituals they performed in the study worked or not. You don't have to believe in the efficacy of a ritual for it to help you feel better. All of these studies are preliminary, and it will be important to see whether they hold up when other researchers try to reproduce the results. Furthermore, there is much more we need to know about why and how rituals work. But these early findings are quite interesting.

Any Old Ritual Will Do

For skeptics who would like to discourage superstitious and irrational thinking, this line of research has both a downside and an upside. The downside is that the research by Brooks et al. suggests that superstitious rituals do work—not because they are magic but because they are rituals. As a result, the calming features of superstitious rituals and the improved performance they engender are likely to sustain superstitious thinking. The superstitious person's beliefs will appear to be validated. The upside, however, is that skeptics now have a ready response to those who claim their superstitions work: Yes, your superstitions work, but it's the ritual, not the superstition that's making you feel better. Any old ritual will do.

References

Brooks, Alison, Juliana Schroeder, Jane Risen, et al. 2016. Don't stop believing: Rituals improve performance by decreasing anxiety. *Organizational Behavior and Human Decision Processes* 137: 71–85.

Calin-Jageman, Robert J., and Tracy L. Caldwell. 2014. Replication of the superstition and performance study by Damisch, Stoberock, and Mussweiler (2010). *Social Psychology* 45(3): 239–45.

Damisch, Lysann, Barbara Stoberock, and Thomas Mussweiler. 2010. Keep your fingers crossed! How superstition improves performance. *Psychological Science* 21(7): 1014–20. Available online at http://www.ncbi.nlm.nih.gov/pubmed/20511389.

Hamerman, Eric J., and Gita V. Johar. 2013. Conditioned superstition: Desire for control and consumer brand preferences. *Journal of Consumer Research* 40(3): 428–43.

Norton, Michael I., and Francesca Gino. 2014. Rituals alleviate grieving for loved ones, lovers, and lotteries. *Journal of Experimental Psychology: General* 143(1): 266–72.

There's much more available on our website!

Skeptical Inquirer

Here's just a sample of what you'll find online at csicop.org:

Sonic Attack Claims Are Unjustified: Just Follow the Facts

In this Special Report sociologist (and newly elected fellow) Robert E. Bartholomew examines the bizarre claims that a "sonic attack" took place at the American embassy in Cuba—an event that threatened international diplomacy. Bartholomew notes that "If one follows the facts and leaves politics aside, the evidence overwhelmingly points in one direction: mass psychogenic illness."

Recent Developments in 'Eastern' Science

Dr. Harriet Hall (aka the SkepDoc) examines claims about the usefulness of sacred Eastern texts (such as the Hindu Vedas and the Islamic Qu'ran) to cure cancer and solve social problems. While many claims have been made about the efficacy of these texts, Hall dryly notes, "It's good to know that science is advancing in India, and I hope they will publish their findings in peer-reviewed journals and share this ancient knowledge to help the rest of the world solve all our problems. I wonder what the Qu'ran and the Vedas have to say about global warming...."

[SKEPTICAL INQUIREE BENJAMIN RADFORD

Benjamin Radford is a research fellow at the Committee for Skeptical Inquiry and author or coauthor of ten books, including *Bad Clowns*.

Just Asking Questions

Q: "I enjoyed your recent investigation into the 2016 Mall of America's black Santa outrage, and I have a question regarding 'asking questions.' How do you tell the difference between someone with a genuine inquiry about something and an ideologue attempting to steer the debate in a specific direction?"

—Al C.

A: I received this query in response to my research into an ugly episode of racial hatred that tainted the 2016 holiday season. The Mall of America hired a jolly bearded man named Larry Jefferson as one of its Santas. Jefferson, a retired Army veteran, was the mall's first African American Santa, and the local newspaper, the *Minneapolis Star Tribune*, carried a story about it on December 1. Later that night an editorial page editor for the *Tribune*, Scott Gillespie, tweeted: "Looks like we had to turn comments off on story about Mall of America's first black Santa. Merry Christmas everyone!"

Overnight and the next morning his tweet went viral and served as the basis for countless news stories with titles such as "Paper Forced to Close Comments On Mall Of America's First Black Santa Thanks to Racism" (Jezebel); "Santa is WHITE. BOYCOTT Mall of America: Online Racists Are Having a Meltdown over Mall's Black Santa" (RawStory); and "Racists Freak Out Over Black Santa At Mall Of America" (*Huffington Post*).

The next day, however, the editor—after seeing stories about the scope and nature of the racist backlash the *Tribune* faced—reversed himself. Instead of "we had to turn off comments" Gillespie stated that the commenting was never opened for that article in the first place: "Comments were not allowed based on past practice w/stories w/racial elements." This raised some questions for me: If the comments had never been opened on the story, then how could there have been a flood of racist comments? Where did that information come from? How many racist comments did the paper actually get? Something didn't add up, and I felt it was important to understand the genesis of this story.

My research (including an interview with Gillespie) eventually revealed that the racial incident never actually occurred and that—despite nearly two million news articles to the contrary—the *Star Tribune* did not receive a single hate-filled message in the comments section of its story on Jefferson. What happened was the product of a series of misunderstandings and mistakes, fueled in part by confirmation bias and amplified by the digital age (for a detailed look at the case see my Center for Inquiry [CFI] blog "The True, Heartwarming Story of the Mall of America's Black Santa" at http://www.centerforinquiry.net/blogs/entry/the_true_heartwarming_story_of_the_mall_of_americas_black_santa/).

I've been writing about journalism errors and media literacy for two decades, and usually there's relatively little pushback (except, perhaps, from journalists reluctant to acknowledge errors). However, part of this story was the criticism I received on social media for researching it. Perhaps the best example was when I responded to a post about the initial story on a fellow skeptic's Facebook page. She and all of her friends on the thread took the erroneous news story at face value (which didn't surprise me, as virtually everyone did), but what did surprise me was the suggestion that trying to uncover the truth was "a distraction tactic—now we can talk about how most people are not racist and change the subject from racism."

If the comments had never been opened on the story, then how could there have been a flood of racist comments? Where did that information come from? How many racist comments did the paper actually get?

I was stunned. I had no idea that trying to determine how many people complained would or could be construed as somehow trying to distract people (from

what to what?). No one—and certainly not me—was suggesting that a certain number of racists upset over a black Santa was acceptable. I never said or implied that if it was "only" ten or 100, then everyone should be fine with it. But knowing the scope of the issue does help us understand the problem: Is it really irrelevant whether there were zero, ten, or 10,000 racist commenters on the Jefferson article? If Trump can be widely (and rightly) criticized for exaggerating (or failing to accurately quantify) the crowd at his inauguration speech as "the largest audience to ever witness an inauguration—period" when in fact it was several orders of magnitude smaller, why is asking about the reporting of viral news stories whose sole basis was one (retracted) tweet so beyond the pale? Another wrote, "'I'm just asking the question. ... Not to personalize this, but this is why I avoid skeptic and atheist spaces." There was clearly some confusion about what constitutes legitimate inquiry, hence Al's question.

Conspiracies

"I'm just asking questions" is a favorite refrain of conspiracy theorists. It is meant to appeal to a sense of openness and fairness; after all, everyone agrees that authority should be questioned. The problem is not that the questions themselves are inherently inappropriate or invalid; it's that the people asking them refuse to accept the answers they are provided by experts. When a conspiracy theorist uses this tactic, it's often clear because their questions have in fact already been answered. For example, 9/11 Truthers love to just "ask questions" such as "How can jet fuel melt steel?" when 1) it contains a faulty premise (steel need only weaken, not melt, to collapse); and 2) it has been answered repeatedly by physicists and skeptics. In this case, I was asking questions that weren't answered at all—until I tracked down the answers myself.

Motivation

Another consideration is the person's motivation, which can often be determined by what sort of questions are being asked. For example, questions designed to establish the factual, journalistic basics (of who, what, where, why, and how) are likely to be born of a genuine desire to establish the facts of the case and understand what happened. In contrast, questions from conspiracy theorists often contain false or unproven assumptions implicit in the question, as noted above.

The source of the questions also offers a clue. It shouldn't be hard to tell whether the person asking questions is a legitimate researcher (e.g., a journalist, academic, or skeptic) or a conspiracy theorist/crank. I've investigated and researched hundreds of news stories where something isn't quite right, from manufactured quotes to journalist innumeracy to misleading statistics—on hundreds of topics ranging from psychics to dowsing and anorexia to alternative medicine. The content of that particular news story (racism against a mall Santa) was of far less interest to me than if it were accurate. It's not a personal issue for me, just as I'm not personally invested in whether or not a person is truly psychic or a new "miracle cure" really works. If so, great. If not, great. (Of course the fact that a vile, viral incident of racism did not in fact occur is great news.) Either way I want to determine the truth.

Usually when I encounter claims of investigating being a distraction in my research it is itself a distraction tactic, an attempt to head off inquiry that might debunk a claim or show that some assumption or conclusion was made in error—not unlike the Wizard of Oz pleading for Dorothy and her gang not to look behind the curtain. ("Why are you asking questions about where I suddenly got this important UFO-related document?" or "Asking for evidence of my faith healer's miracle healings is just a distraction from his holy mission" doesn't deter any skeptic worth his or her salt.) If a claim is valid and factual, there's no reason anyone would object to confirming that; as Thomas Paine noted, "It is error only, and not truth, that shrinks from inquiry."

I tried to remember where else I'd heard the phrase used recently, when someone who was asked about something called the questions a "distraction." Finally I realized where that tactic had become common: the Trump administration. When Donald Trump was asked about the leaked *Access Hollywood* recording of him bragging about groping women sexually, he dismissed the questions—and indeed the entire issue—as "nothing more than a distraction from the important issues we're facing today."

It's also important to understand why a person's questions are being challenged in the first place. It's often due to tribalism and a lack of charity. Ray Hyman, in his influential short piece titled "Proper Criticism," lists charity among eight important principles:

> The principle of charity implies that ... we should try to resolve the ambiguity in favor of the claimant until we acquire strong reasons for not doing so. In this respect, we should carefully distinguish between being wrong and being dishonest. ... Furthermore, we often have a choice in how to interpret or represent an opponent's arguments. The principle tells us to convey the opponent's position in a fair, objective, and non-emotional manner.

To scientists, journalists, and skeptics, asking for evidence is an integral part of the process of parsing fact from fiction, true claims from false ones. If you want me to believe a claim—any claim, from advertising claims to psychic powers and conspiracy theories to the validity of repressed memories—I'm going to ask for evidence. It doesn't mean I think (or assume) you're wrong or lying; it just means I want a reason to believe what you tell me. This is especially true for memes and factoids shared on social media and designed to elicit outrage or scorn.

But to most people who don't have a background in critical thinking, journalism, skepticism, or media literacy, asking for evidence is akin to a challenge to their honesty. Theirs is a world in which personal experience and anecdote are self-evidently more reliable than facts and evidence. And it's also a world in which most of the time when claims are questioned, it's in the context of confrontation. To a person invested in the truth of a given narrative, any information that seems to confirm that idea is much more easily seen and remembered than information contradicting the idea; that's the principle of confirmation bias. Similarly, when a person shares information on social media it's often because he or she endorses the larger message

or narrative, and they get upset if that narrative is questioned or challenged. From a psychological point of view, this heuristic is often accurate: much or most of the time when a person's statement or claim is challenged (in informal settings or social media for example), the person asking the question does indeed have a vested interest.

The problem is when the person does occasionally encounter someone who is sincerely trying to understand an issue or get to the bottom of a question. The knee-jerk reaction is often to assume the worst about them. People are blinded by their own biases, and they project those biases on others. This is especially true when the subject is controversial, such as with race, gender, or politics. To them, the only reason people would question a claim is if they were trying to discredit that claim or a larger narrative it's being offered in support of.

Of course that's not true; people should question all claims and *especially* claims that conform to their pre-existing beliefs and assumptions; those are precisely the ones most likely to slip under the critical thinking radar and become incorporated into our beliefs and opinions. I question claims from across the spectrum, including those from sources I agree with. To my mind, the other approach has it backward: How do you know whether to believe a claim if you don't question it?

My efforts to research and understand this story were born not of any doubt that racism exists, nor even that Jefferson was targeted, but instead of a background in media literacy and a desire to reconcile two contradictory accounts about what happened. Outrage-provoking stories on social media—especially viral ones based on a single, unconfirmed informal tweet—should concern all of us in this age of misinformation and "fake news."

The real tragedy in this case is what was done to Larry Jefferson, whose role as the Mall of America's first black Santa has been tainted by this social media–created controversy. Instead of being remembered for, as he said, bringing "hope, love, and peace to girls and boys," he will forever be known for enduring a (fictional) deluge of bilious racist hatred. The true story of Jefferson's stint as Santa is diametrically the opposite of what most people believe: He was greeted warmly and embraced by people of all colors and faiths as the Mall of America's first black Santa. I understand that "Black Santa Warmly Welcomed by Virtually Everyone" isn't a headline that any news organization is going to see as newsworthy or eagerly promote, nor would it go viral. But it's the truth—and the truth matters.

I'm reminded of a quote from Carl Sagan: "Even when it's applied sensitively, scientific skepticism may come across as arrogant, dogmatic, heartless, and dismissive of the feelings and deeply held beliefs of others. When someone comes along who challenges our belief system as insufficiently well-based ... or demonstrates that we've swept key underlying assumptions under the rug—it becomes more than a search for knowledge. It feels like a personal insult."

Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON
DIGITAL EDITION
DOWNLOAD YOUR COPY NOW!
GET IT ON Google play
Available on the App Store
Subscribe to the digital edition of the SKEPTICAL INQUIRER and read SI on your iPad, iPhone, or Android device!
Download your FREE sample issue today!
Statues Controversy | We Need Experts | Science and Inequality | Roman Colosseum | Giant Pandas
Skeptical Inquirer
THE MAGAZINE FOR SCIENCE AND REASON
A SKEPTIC'S GUIDE TO
RACISM
Critical Thinking on a Critical Issue
A SPECIAL SECTION
In What Version of Evolution Do You Believe?
Susan Blackmore on Daryl Bem and Psi
SHARPs: A New Term for Us All?
Is Anorexia Really on the Rise?
A Cancer Nurse on Medical Pseudoscience
Teach Pseudoscience in Universities
'Free Energy' Claims

The War on Science, Anti-Intellectualism, and 'Alternative Ways of Knowing' in 21st-Century America

The decades-long academic assault on science has bewildered the American public about the role and function of science, promoted anti-intellectualism, and politically empowered purveyors of supernaturalism and paranormal beliefs.

H. SIDKY

At the start of the twentieth century, over 40 percent of Americans did not know that the Earth orbits the sun in a year-long cycle (Otto 2016, 224). Another 52 percent did not know that dinosaurs died before the appearance of humans, and 45 percent were unaware that the world is older than 10,000 years. It is unnecessary to mention the equally alarming numbers of people who believe in ghosts, space aliens, paranormal monsters, devil possession, angels, demons, miracles, and so forth (Smith 2010, 22–23).

This mostly scientifically illiterate public seems to lack the necessary skills to distinguish between contending claims to knowledge or differentiate between fact and opinion. We now live in a scary and confusing "post-truth" era of disinformation, "fake news," "counterknowledge," "weaponized lies," conspiracy theories, magical thinking, and irrationalism (see Andersen 2017; Levitin 2016).

Bogus and irrational ideas (beliefs that have been falsified or are unfalsifiable) are thriving and seem to be widely received and accepted. However, tolerating irrationalism and scientific illiteracy poses many dangers. It is dangerous to individual well-being. Numerous people have died because of their trust in sham alternative medical cures, and many others have lost their life savings by believing in psychics and miracle workers (see Bridgstock 2009, 1–3; Coyne 2015, 229–239; Gilovich 1993, 5–6; Hines 2003, 38–41; Schick and Vaughn 2014, 12–13). More than that, acquiescence to irrationalism threatens the well-being of our society (see Mooney and Kirshenbaum 2009; Sharlet 2010). As philosophers Theodor Schick and Lewis Vaughn (2014, 13) have put it:

> A democratic society depends on the ability of its members to make rational choices. But rational choices must be based on rational beliefs. If we can't tell the difference between reasonable and unreasonable claims, we become susceptible to the claims of charlatans, scoundrels, and mountebanks.

Purveyors of supernaturalism, anti-intellectual dogmas, medieval credulities, and "alternative forms of knowledge" that are daily an affront to our intelligence and sensibilities are swarming with bluster and hubris that science is now defunct and offer their own "truths" and "ways of knowing" as better substitutes. However, before we submit to the assertions of religious ideologues, miracle workers, and quacks and make their "truths" the basis of our worldview, we need to ask the following question: Are the assertions that science is defunct based on compelling evidence? To answer this question, let's look at the circumstances that brought us here.

Explanations for the rise of anti-intellectualism and antiscience perspectives in this country would no doubt include many complex interconnected factors, such as globalization, demographic shifts, changes in the socioeconomic infrastructure, disparities in wealth and power, the disenchantment of the world by science and technology, and so forth. However, as the science writer Shawn Otto discusses in his recent book *The War on Science: Who Is Waging It, Why It Matters, What We Can Do About It* (2016), the decades-long systematic academic assault on science and rationalism stands above many other factors. Paul Gross and Norman Levitt's *Higher Superstition: The Academic Left and Its Quarrels with Science* (1994) also provides an insightful account of the academic war on science. More specifically, philosopher and historian of science Noretta Koertge (1998) explores the direct influence this assault on science has had on scientific literacy in various fields of study in the United States. Embarrassingly, cultural anthropology, the discipline to which I belong, was instrumental in this untoward enterprise (see Otto 2016, 175–176).

From the late 1960s cultural anthropologists—in concert with their counterparts in departments of English, education, journalism, political science, cultural studies, science studies, and humanities—collectively engaged in a seemingly well-intentioned intellectual enterprise to "speak truth to power." Their objective was to promote epistemological egalitarianism open to diverse viewpoints and create a more tolerant, multicultural society free of all the evils of modernity. They argued that modernity's hegemonic power and authoritarianism had to be exposed, and these savants claimed to possess the intellectual tools to accomplish this task. In their discourse, science and scientific truths (deceptively misconstrued as "absolute truths") were cast as the embodiment of that hegemonic power and its evils, such as racism, sexism, imperialism, colonialism, militarism, oppression, slavery, white supremacy, the atomic bomb, and the destruction of the biosphere.

This intellectual movement was known variously as *social constructivism*, *deconstructionism*, *post-structuralism*, and *postmodernism*. Here I shall use the label *postmodernism* (Sokal 2008, 269).The paragons of this movement consisted of a handful of French philosophers, including Michel Foucault, Jacques Derrida, Jean-François Lyotard, and Bruno Latour (see Sidky 2004, 394–412). Although their works differed in various respects, they shared general features, such as a disdain for the rationalist tradition of the Enlightenment, a disregard for empirical data and logic, the idea of "the cultural construction of knowledge," and subjective and intuitive approaches to knowledge. Moreover, although pontificating about science became their forte, none of these scholars were trained as professional scientists.

Irrationalist philosophers in the United States, such as Thomas Kuhn and Paul Feyerabend, also contributed to the postmodern antiscience program. In his highly acclaimed book *The Structure of Scientific Revolutions* (1970), Kuhn asserted that scientific truths depend upon agreement among scientists operating under a guiding intellectual umbrella, or paradigm, built around a core of ideas based on irrational cultural and sociopolitical factors. A paradigm persists for a while until mounting anomalies it cannot address result in a "scientific revolution" and the establishment of a new paradigm built upon new conventions linked to a different set of sociopolitical factors. According to Kuhn, the solution to questions are *relative* to a paradigm rather than empirical evidence. For this reason, paradigms are incommensurable, and there is no real growth of scientific knowledge. If true, this would mean that our knowledge of the world and universe today has not increased beyond the state of knowledge four hundred years ago, a view that verges on the ludicrous and is a misrepresentation of the history of science. Solutions under previous paradigms do not become "un-solutions" after paradigm shifts (Kuznar 2008, 57; Stove 2001). Hence scientists still use Newton's law of gravity to calculate the orbits of spacecraft (Stenger 2008, 114–115). As the philosopher David Stove (2001, 21–50) points out in his devastating critique, Kuhn's irrationalist view of science appears plausible because he relies on evocation, ambiguity, false equivalencies, and clever inconsistencies. There are only a few instances of Kuhnian type revolutions in the history of science. For this reason, the Nobel laureate phys-

Cultural anthropologists' well-intentioned objective was to promote egalitarianism open to diverse viewpoints and create a more tolerant, multicultural society free of all the evils of modernity.

icist Steven Weinberg (1998) refers to Kuhn's ideas as "the revolution that didn't happen."

Paul Feyerabend, the author of *Against Method* (1975), similarly advocated the idea of the cultural construction of knowledge, asserting that scientific research protocols and methodology are merely ornamentations that legitimize truths established through irrational means subject to sociopolitical and historical factors. Starting from a reasonable observation that "all methodologies have limitations," Feyerabend (1975, 296) reached the erroneous conclusion, and a true *non sequitur*, that in the pursuit of knowledge "anything goes" both in the context of discovery and in the context of justification (Sokal 2008, 199). Therefore, there are no epistemological distinctions between science and religion or mythology. This is a gross misrepresentation of the scientific enterprise (Gross and Levitt 1994, 47).

Although pontificating about science became their forte, none of these scholars were trained as professional scientists.

Despite such epistemological problems, postmodernists were able to launch an all-encompassing disinformation campaign to delegitimize science and rationality. The distressing effects of this campaign were painfully brought to light for many after the 2016 U.S. presidential election. The assault on science centered on the idea of epistemological relativism. This entails the premise that conditions of knowledge are such that the truth and falsity of assertions are context-dependent, situated, and always relative to cultural and social backgrounds, political position, class, gender, ethnicity, race, and religion. Thus, the idea that scientific knowledge depends upon objective empirical evidence is false. Excluding the empirical dimension of the scientific enterprise, these writers misrepresented science as merely a "story" or narrative like any other that relies on rhetorical ornamentation and language games to persuade people of its legitimacy and authority. Epistemological relativism dictates that no representations of reality or story can be privileged because there are multiple and equally valid realities and truths. Moreover, because all truths are relative, postmodernists asserted, whose truth prevails is a coefficient of power and coercion (Foucault 1984, 75). The West is dominant and hegemonic, and hence its "truths" (i.e., science) are privileged.

To expose the exact nature of power relations, postmodern thinkers believed, one had to look at the linguistic context of truth claims because nothing exists apart from the discourse that constitutes them. In other words, apprehension of a reality outside the linguistic webs that entangle us is not possible, which is an assertion that goes against anthropological evidence, science, common sense, and everyday epistemology. We survive and act successfully in the world during our day-to-day interactions by assuming that reality "out there" exists (Abel 1976, 33). Despite many factors that bias our perceptions in various ways, our senses do not systematically deceive us all the time. That is why we do not intentionally bump into walls, walk off cliffs, or step into traffic. Hence, we are not hopeless prisoners of language. We navigate the world using the same principles encapsulated in the scientific method by continuously making decisions about our perceptions according to the rules of inductive/deductive hypothesis testing and refutation (Fox 1997, 341). Science does this more systematically and with greater rigor. As the philosopher Karl Popper (1972) put it, science is enlightened common sense. Science is *a human enterprise* that generates *approximate* understandings *in human terms* of "something" (call it "reality," the empirical world, or whatever) that seems to exist apart from our perceptual and cognitive apparatus rather than being generated by it (see Lett 1986; 1997). Postmodernists left that "something" out of their epistemological equation. For them, everything was about language and linguistic webs that form perceptual prisons from which there is no escape. However, these writers believed that they possessed the skills to reveal the occult codes of power by looking at seemingly inconsequential aspects of language, such as "tropes," rhetorical strategies, and figurative devices that are invisible to conventional analysts and even the authors of those texts.

Ironically, given that this enterprise was about epistemological egalitarianism and human dignity, those who did not accept postmodern premises were labeled racists, sexists, right-wing oppressors, colonialists, and the instruments of a defunct materialist worldview (the terms of opprobrium were endless). In the halls of American academia, postmodernism acquired a frightening authoritarianism similar to religion, complete with self-styled messiahs, infatuated acolytes, sacred texts, secret mantras, taboo words, and moral injunctions.

The postmodern antiscience perspective had several inherent flaws that both ensured its ultimate failure and sadly rendered its proponents entirely irrelevant as a political force today. First, it confused the authority of science with that of the person conveying scientific knowledge. In science, the ultimate arbiter is the evidence; it is gravity—not the scientist asserting that an apple will plummet to the ground—that is the defining condition of knowledge in the end. Sadly, relativist antiscience writers remain befuddled about this issue (e.g., Herzfeld 2017). It is an epistemological blunder

to confuse the assertions of facts (e.g., the words used to describe gravity) with the facts themselves (that apples fall from trees) as aspects of the external world that exist irrespective of how we know or which words we use to write about them. By taking this stance, postmodernists transformed the reasonable position that "facts do not speak for themselves" into the absurd conclusion that "there are no facts," and that no knowledge of the empirical world is possible, which is a gross *non sequitur* (Spaulding 1988, 264).

Second, the postmodern perspective was self-contradictory because it claimed that all truths were relative to class, gender, ethnicity, and cultural background but excluded itself from the constraints of culture, history, and context (Sidky 2004, 399). As Schick and Vaughn (2014, 311–312) have put it:

> To say that everything is relative is to say that no unrestricted universal generalizations are true (an unrestricted universal generalization is a statement to the effect that something holds for all individuals, societies, or conceptual schemes). But the statement that "No unrestricted universal generalizations are true" is itself an unrestricted universal generalization. So if relativism in any of its forms is true, it's false.

Third, there were no specified rules for extracting the codes of power and encrypted significations from texts. Careful reading does not accomplish this task. So how does one proceed? Remarkably, the answer was through subjective means, using the postmodern scholars' personal and often oversimplified moral categories of exploitation versus resistance, with truth conflated with "good" provided by and suited to the analyst's moralistic sensibilities (Sahlins 1999). This enterprise was not about the discovery of new knowledge because the analyst herself or himself provided the "truth" (Salzman 2001, 136). These writers professed a self-righteous desire to "speak truth to evil" (Scheper-Hughes 1995), but it was their own "truth" arrived at using extraordinary capacities and hermeneutic ingenuities with which they credited themselves and denied everyone else (Sidky 2007, 68). However, their colossal blunder was to assume that the political and moral values they were promoting would be embraced by others in society at large along with their antiscience message.

Fourth, the postmodern discourse was characterized by strategic ambiguity. It was full of obscure literary allusions, baroque rhetorical forms, and contrived scientific-sounding jargon, such as "non-Euclidian space," "chaos theory" "reversal of cause and effect," and "endorphin of culture" that sounded erudite but made for incomprehensible texts. Somehow being abstruse was equated with being profound (Carneiro 1995, 14). However, most of their brilliant insights about knowledge and science were pure nonsense. It turned out that even the leading icons of the movement did not understand much of what was said. The New York University physicist Alan Sokal brought this to light by submitting a parody article full of absurdities and blatant *non sequiturs* to *Social Text*, one of the prestigious postmodern journals. The paper, with the lovely title "Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity," was accepted and published in a special issue, called "Science Wars," devoted to refuting the critics of postmodernism. When Sokal revealed the hoax, the embarrassed postmodern savants reacted with indignation, hostility, and the only weapons they had: special pleading, specious rationalizations, and *ad hominin* attacks (e.g., Robbins and Ross 2000). The hoax revealed the true obscurantist and nonsensical nature of postmodern discourse. In their book *Fashionable Nonsense*, Sokal and Bricmont (1998, 207) made the following observation concerning the effects of postmodernism: "The deliberately obscure discourses of postmodernism, and the intellectual dishonesty they engender, poison a part of intellectual life and strengthen the facile anti-intellectualism that is already too widespread in the general public."

For forty years, the postmodern savants in universities across the country indoctrinated students with their antiscience message (Otto 2016, 198). The substitute they offered was epistemological relativism as the avenue to establish a genuinely just and tolerant society open to diverse viewpoints. At the time, few of these scholars considered the actual implications of their effort to disqualify objective empirical evidence as the basis for evaluating claims to knowledge and public policy. Science-minded scholars, however, were not so oblivious. As Sokal and Bricmont (1998, 209) pointed out: "If all discourses are merely 'stories' or 'narrations,' and none is more objective or truthful than another, then one must concede that the worst sexist or racist prejudices and the most reactionary socio-economic theories are 'equally valid.'"

At the time, few of these scholars considered the actual implications of their effort to disqualify objective empirical evidence ... . Science-minded scholars, however, were not so oblivious.

Many of those indoctrinated in postmodern antiscience went on to become conservative political and religious leaders, policymakers, journalists, journal editors, judges, lawyers, and members of city councils and school boards. Sadly, they forgot the lofty ideals of their teachers, except that science is bogus (Otto 2016, 199). Thus, vast cadres of people with little interest in the message of multiculturalism and epistemological egalitarianism coopted the central lesson of postmodernism that truth is what

one wants it to be to assert the legitimacy of their authoritarian dogmas, irrationalism, and bunkum. Even some hardcore antiscience philosophers now acknowledge the unpleasant consequences of their imprudent intellectual enterprise. As the noted postmodern "sociologist of science" Bruno Latour (2004, 227) has put it:

> … entire Ph.D. programs are still running to make sure that good American kids are learning … that facts are made up, that there is no such thing as natural, unmediated, unbiased access to truth, that we are always prisoners of language, that we always speak from a particular standpoint, and so on, while dangerous extremists are using the very same argument of social construction to destroy hard-won evidence that could save our lives.

Latour, to his credit, now goes even further in acknowledging the damage the science critique has caused. As noted in the March/April 2018 Skeptical Inquirer, Latour, in a recent interview for *Science* (de Vrieze 2017), said the science criticisms created the basis for antiscientific thinking and he now wants to help rebuild trust in science.

As the philosopher Karl Popper put it, science is enlightened common sense.

The effects of all this on today's media and politics are startling. Gonzo journalism has become widespread, and few in the profession consider speaking truth to power or even objectivity in reporting as part of their responsibilities (Otto 2016, 23, 129, 200). In this intellectual climate, pretentious and utterly unqualified politicians are flagrantly flaunting opinions on issues ranging from vaccines, human reproduction, stem cell research, the origins of the Earth, and human evolution, to the state of the biosphere, that are contrary to overwhelming historical and scientific evidence. In these cultural circumstances, institutions of higher learning have become beleaguered citadels in a vast ocean of irrationality expressed with bravado and pride, a blowback effect partly the creation of postmodern academics themselves. Emboldened xenophobia, scapegoating of ethnic minorities for social ills, and outright racism and bigotry have replaced political correctness, civility, and cultural sensitivity. In the same context, the nonacademic counterparts of postmodernism—pseudoscience, fortunetelling, astrology, and paranormal religions—are flourishing (see Sokal 2008, 263–370).

There are also the climate change deniers, oxymoronic scientific creationists, intelligent design exponents, and hordes of emboldened and intolerant religious fundamentalists. These ideologues along with their white supremacist allies bent on making America white again have taken over the political arena with a vengeance and are seeking to establish the theocracy of Jesus (see Blaker 2003; Hedges 2006; Sharlet 2010; Stenger 2003, 10). Taking advantage of these circumstances, profit-hungry energy extraction and agrochemical industries, seeking to dodge environmental and safety regulations and undermine policymaking based on scientific evidence, have formed an "unholy alliance" with fundamentalist churches presenting a unified front against science and rationality (Sokal 2008, xv).

Thus, during the second decade of the twenty-first century, it is not the Enlightenment view based on rationality and science but supernaturalism, anti-intellectualism, and obscurantism that compose the most potent forces in the private and national life of the United States. These developments are astonishing in a country historically known for secularism, the separation of church and state, science-driven technological innovations, and the exulted ideal that public policy must look to scientific evidence instead of appealing to emotion, religious dogma, or authority. The latter was the view cherished and espoused by this nation's founding figures such as Thomas Paine, Thomas Jefferson, and Benjamin Franklin.

The postmodern assault on science and its relativism has left us vulnerable to the absurdities of the defenders of supernaturalism, the deception of quacks, and the fanaticism of religious fascists and would-be dictators. History teaches that whenever and wherever irrationalism and relativism have acquired political force, human suffering, violence, oppression, and loss of life have inevitably followed. The example of Nazi Germany will suffice here. Welcome to the postmodern world(?).

Did the postmodern view of knowledge represent "the rearrangement of the very principles of intellectual perspective" (Herzfeld 2001, x, 2, 5, 9, 22), as one infatuated anthropologist put it? No. Was its case against science compelling and based on evidence? No. What the postmodern savants offered was disinformation and an intellectually dishonest enterprise that accomplished nothing aside from bewildering the American public about the role and function of science. Are we justified to abandon science in favor of the alternatives proposed by the purveyors of supernaturalism and other obscurantisms? No.

As Albert Einstein put it, science is one of the most precious things we have. It is valuable not because it guarantees absolute truths free of bias, error, and deception but because it is a unique self-correcting method for reducing bias, mistakes, and fraud to advance our understanding of the social and natural worlds and the universe. Science "is a language that all can use and share in and learn," as anthropologist Robin Fox (1992, 49) noted, and "the wretched of the earth want science and the benefits of science. To deny them this is another kind of racism." Among all the ways of knowing ever devised, only science strives to combat our confirmation biases by demanding that practitioners question their premises and to systematically expose their conclusions to the inspection of unsympathetic nonbelievers (Harris 1979, 27). The hallmark of science is the question "What is the evidence?"

The hallmark of the alternative perspectives touted by our "home-grown ayatollahs" and obscurantist gurus is "I wish to believe" (Harris 1987, 14). Science remains our only path toward "thinking straight about the world," which is something urgently needed at this critical historical juncture as irrationalism and fanaticism are "bubbling up around us" (Gilovich 1993, 6; Sagan 1996, 27). ■

Acknowledgments

I thank Dr. Lawrence Kuznar (Department of Anthropology, Indiana University–Purdue University, Fort Wayne, Indiana) and Dr. Raymond Scupin (Department of Anthropology and Sociology, Lindenwood University, St. Charles, Missouri) for reading this paper and for their many comments and suggestions. I alone assume responsibility for the views expressed in this essay.

References

Abel, Reuben. 1976. *Man Is the Measure: A Cordial Invitation to the Central Problems of Philosophy*. New York: The Free Press.

Andersen, Kurt. 2017. *Fantasyland: How America Went Haywire: A 500-Year History*. New York: Random House.

Blaker, Kimberly (ed.). 2003. *The Fundamentals of Extremism: The Christian Right in America*. Michigan: New Boston Books.

Bridgstock, Martin. 2009. *Beyond Belief: Skepticism, Science and the Paranormal*. Cambridge: Cambridge University Press.

Carneiro, Robert. 1995. Godzilla meets new age anthropology: Facing the post-modernist challenge to a science of culture. *Europaea* (Italy) 1: 3–22.

Coyne, Jerry. 2015. *Faith vs. Fact: Why Science and Religion Are Incompatible*. New York: Penguin Books.

De Vrieze, Jop. 2017. 'Science Wars' veteran has a new mission. *Science* 358: 159.

Feyerabend, Paul. 1975. *Against Method*. London: New Left Books.

Foucault, Michel. 1984. *The Foucault Reader*. New York: Pantheon.

Fox, Robin. 1992. Anthropology and the 'teddy bear' picnic. *Society* 30(2): 47–55.

———. 1997. State of the art/science in anthropology. In *The Flight from Science and Reason*. Paul Gross, Norman Levitt, and Martin Lewis (eds.). New York: New York Academy of Science, pp. 327–345.

Gilovich, Thomas. 1993. *How We Know What Isn't So: The Fallibility of Human Reason in Everyday Life*. New York: The Free Press.

Gross, Paul, and Norman Levitt. 1994. *Higher Superstition: The Academic Left and Its Quarrels with Science*. Baltimore, MD: The Johns Hopkins University Press.

Harris, Marvin. 1979. *Cultural Materialism: The Struggle for a Science of Culture*. New York: Vintage Books.

———. 1987. *Why Nothing Works: The Anthropology of Daily Life*. New York: Simon & Schuster.

Hedges, Chris. 2006. *American Fascists: The Christian Right and the War on America*. New York: Free Press.

Herzfeld, Michael. 2001. *Anthropology: Theoretical Practice in Culture and Society*. Oxford: Blackwell.

———. 2017. Anthropological realism in a scientistic age. *Anthropological Theory* (August 13):1–22.

Hines, Terence. 2003. *Pseudoscience and the Paranormal*. Amherst, NY: Prometheus Books.

Koertge, Noretta. 1998. Postmodernism and the problem of scientific literacy. In *A House Built on Sand: Exposing Postmodern Myths about Science.* Noretta Koertge (ed.). Oxford: Oxford University Press, pp. 257–271.

Kuhn, Thomas. 1970. *The Structure of Scientific Revolutions*. Chicago: University of Chicago Press.

Kuznar, Lawrence. 2008: *Reclaiming a Scientific Anthropology*. Walnut Creek, CA: AltaMira.

Latour, Bruno. 2004. Why has critique run out of steam? From matters of fact to matters of concern. *Critical Inquiry* 30: 225–248.

Lett, James. 1986. *The Human Enterprise: A Critical Introduction to Anthropological Theory*. Boulder, CO: Westview Press.

———. 1997. *Science, Reason, and Anthropology: The Principles of Rational Inquiry*. Lanham, MD: Rowman & Littlefield.

Levitin, Daniel. 2016. *Weaponized Lies: How to Think Critically in the Post-Truth Era*. New York: Dutton.

Mooney, Chris, and Sheril Kirshenbaum. 2009. *Unscientific America: How American Scientific Illiteracy Threatens Our Future*. New York: Basic Books.

Otto, Shaw. 2016. *The War on Science: Who Is Waging It, Why It Matters, What We Can Do About It.* Minneapolis: Milkweed.

Popper, Karl. 1972. *Objective Knowledge: An Evolutionary Approach*. Oxford: Oxford University Press

Robbins, Bruce, and Andrew Ross. 2000. Response: Mystery science theater. In *The Sokal Hoax: The Sham that Shook the Academy*. Editors of *Lingua Franca* (ed.). Lincoln, NE: University of Nebraska Press, pp. 54–58.

Sagan, Carl. 1996. *The Demon-Haunted World: Science As a Candle in the Dark*. New York: Ballantine Books.

Sahlins, Marshall. 1999. What is anthropological enlightenment? *Annual Review of Anthropology* 18: i–xxiii.

Salzman, Philip. 2001. *Understanding Culture: An Introduction to Anthropological Theory*. Prospect Heights, IL: Waveland.

Scheper-Hughes, Nancy. 1995. The Primacy of the Ethical: Propositions for a Militant Anthropology. *Current Anthropology* 36: 409–420.

Schick, Theodore, and Lewis Vaughn. 2014. *How to Think About Weird Things: Critical Thinking for a New Age*. New York: McGraw-Hill.

Sharlet, Jeff. 2010. *C Street: The Fundamentalist Threat to American Democracy*. New York: Little Brown.

Sidky, H. 2004. *Perspectives on Culture: A Critical Introduction to Theory in Cultural Anthropology.* Upper Saddle River, NJ: Prentice Hall.

———. 2007. Cultural materialism, scientific anthropology, epistemology, and "narrative ethnographies of the particular." In *Studying Societies and Cultures: Marvin Harris's Cultural Materialism and Its Legacy*. Lawrence Kuznar and Stephen Sanderson (eds.). Boulder, CO: Paradigm Publishers, pp. 66–77.

Smith, Jonathan. 2010. *Pseudoscience and Extraordinary Claims of the Paranormal*. West Sussex: Wiley-Blackwell.

Sokal, Alan. 2008. *Beyond the Hoax: Science, Philosophy and Culture*. Oxford: Oxford University Press.

Sokal, Alan, and Jean Bricmont. 1998. *Fashionable Nonsense: Postmodern Intellectuals' Abuse of Science*. New York: Picador.

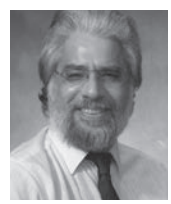
Spaulding, Albert. 1988. Distinguished lecture: Archaeology and anthropology. *American Anthropologist* 90 (2): 263–271.

Stenger, Victor. 2003. *Has Science Found God? The Latest Results in the Search for Purpose in the Universe*. Amherst, NY: Prometheus Books.

———. 2008. *God: The Failed Hypothesis: How Science Shows That God Does Not Exist*. Amherst, NY: Prometheus Books.

Stove, David. 2001. *Scientific Irrationalism: Origins of a Postmodern Cult*. New Brunswick, NJ: Transaction Publishers.

Weinberg, Steven. 1998. The revolution that didn't happen. *New York Review of Books* (October 8).



H. Sidky, PhD, is professor of anthropology and chief departmental advisor in the Department of Anthropology at Miami University (Ohio). He refers to himself as a scientific anthropologist. He is working on a book on the topic of this essay.

Drug Therapy Hype: The Misuse of Data

There are several flagrant examples of hype from cancer and cardiac therapy. The drugs Avastin and Opdivo, which have serious problems, have been greatly overhyped. Statins, which *are* effective in saving lives from heart attacks and stroke, have been subjected to negative hype meant to discourage their use.

REYNOLD SPECTOR

Hype is promotion of an intensive extravagant nature that is often deceptive and frequently meant to stimulate the recipient to do or not do something. There is both positive hype (meant to stimulate action) and negative hype (to discourage action). Hype can be differentiated from hyperbole (and what in advertising is called "puffery"), an exaggerated statement or claim not meant to be taken literally. Complicating matters is the imprecision of language; ambiguity and vagueness abound.

We should separate hype from lies, although in many cases extreme hype tends toward lying. But to define lies we must first define truth. Truth applies to statements (propositions). A statement is true if:

1) The statement corresponds to reality;
2) The statement is coherent with other facts;
3) The statement has pragmatic implications, e.g., predictions based on the statement have not been falsified.

Lies are statements that are not true and may be told with or without intent to deceive.

In America and much of the developed world, hype is present everywhere: on the Internet and in advertisements, television, newspapers, and books. Most of the time, educated persons can separate hype and lies from the truth, but there are situations where hype is often "effective" and harmful or can cause great uncertainty, e.g., in medicine, government, or the law. Before I discuss some medical examples of hype, some important background information is in order.

Background

Physicians, including pediatricians, radiologists, and surgeons, have five main objectives:

1) Whenever possible, physicians try to prevent disease (e.g., with vaccines);
2) If disease occurs, they try to cure it with medicine, surgery, or radiation;
3) If a cure is not possible, they try to prolong and improve the quality of life;
4) Physicians often give patients support to normalize troublesome symptoms (e.g., remedies for insomnia and constipation);
5) Physicians try to achieve these objectives at reasonable cost (value).

To accomplish these goals, physicians must often deal with variabilities among individuals, especially in prognosis and their response to therapy. It is true that in some cases (e.g., vaccination against hepatitis A and B or papilloma virus) there is a 100 percent response and complete protection against the viruses in the vaccine. However, in many situations, the responses to drugs and vaccines are variable. To overcome this variability in drug response and the inability to identify in advance which patients will respond, regulatory bodies (e.g., the U.S. Food and Drug Administration [FDA]) have generally required the application of scientific methods, which include replicative randomized controlled trials (often blinded) comparing the new treatment versus a placebo or appropriate control for licensure and sale of prescription drugs. If there are enough patients in the trials and they correspond to the patient population to be treated, these trials allow a reasonable estimate of efficacy (e.g., whether the patients will live or die) and toxicity (although rare severe toxicity may occur post-marketing when large numbers of patients are treated).

Cancer Therapy

Some cancer patients cannot be cured by surgery, radiation,

or drugs. In such cases, there is general agreement that their treatments:

1) Should prolong life;

2) Should improve the "quality" of remaining life; and

3) Should have a cost consistent with its value in 1) and 2) above (Workman et al. 2017).

It is often difficult in controlled trials (new drug versus placebo or standard regimen) for technical and ethical reasons to find the average prolongation of life in cancer therapy, so median survival is often employed (i.e., the time for half the patients to die). This is a practical endpoint and is widely accepted by the FDA and public as meaningful (Hsu and Shaw 2017); there is no ambiguity about whether the patients are alive or dead.

In terms of the epidemiology of cancer in the United States, for the first time, cancer deaths in the United States in 2017 will probably exceed heart disease as the number one cause of death (over 600,000) (Spector 2016). In 1950, heart disease killed many times more patients than cancer, and stroke was the second leading cause of death (Spector 2016; Mozaffarian et al. 2016). Now stroke is the fifth leading cause of death in the United States with about 130,000 deaths annually. Since 1950, there has been a remarkable decline in deaths in age and sex matched populations in the United Sates due to heart disease and stroke (Mozaffarian et al. 2016). This is largely due to medications such as statins and aspirin, blood pressure control (with medications), and lifestyle (risk factor) modifications including diet, weight loss, exercise, and cessation of smoking. Some argue that cancer is a disease of the elderly and therefore has increased, but so is heart disease and stroke.

Although there have been multiple waves of hype about cancer therapy in the United States since 1950, there indeed has been striking progress in treating some cancer patients with drug and radiation therapy; for example, choriocarcinoma, testicular cancer, Hodgkin's disease, and several relatively uncommon childhood cancers can in most cases be cured. Moreover, the number of smokers has declined appreciably, resulting in a significant decline in lung cancer. There has also been a largely unexplained decline in stomach cancer. Most impressive is the fact that two vaccines can prevent cancer—hepatitis B vaccine can prevent liver cancer and human papilloma vaccine can prevent most cases of cancer of the cervix and other rare cancers. However, the common cancers—e.g., lung, breast, prostate, stomach, pancreas, brain, and others—still kill more than 600,000 each year in the United States, and the number is rising. Later I will discuss the reasons for the widespread failure of cancer therapy. Now to examples of hyped drugs.

Avastin (bevacizumab) and Opdivo (nivolumab)

Over ten years ago, there was in the press, on the Internet, and on the television tremendous hype about the possibility of interfering with vascular endothelial growth factor (VEGF) with an antibody bevacizumab (Avastin). The idea was bevacizumab could stop blood vessels growing into the tumors by blocking VEGF action and hence "starve the tumor" of nutrients and oxygen; this mechanism of action

According to the FDA-approved product insert for Avastin (accessed June 2017), Avastin does not increase median survival compared to controls in breast, brain, or kidney cancer.

would slow or stop tumor growth and spread. For a decade, Avastin has been widely used, and about $6 billion per year has been spent purchasing the drug (Tucker 2011). But according to the FDA-approved product insert for Avastin (accessed June 2017), Avastin does not increase median survival (MS) compared to controls in breast, brain, or kidney cancer. In fact, in a recent definitive controlled study of Avastin and brain cancer, not only did Avastin not increase MS, improve the quality of life, or decrease steroid useage, Avastin greatly increased serious side effects. Avastin has no place in the therapy of brain cancer (Wick et al. 2017). In lung cancer, one study showed a two-month increase in median survival; a second study showed no increase. Finally, in the initial study in metastatic colon cancer, there was a four-month increase in medium survival (twenty versus sixteen months). However, a second study (in the product insert) showed a two-month increase in MS (thirteen versus eleven months). Subsequent studies showed less than two months.

In 2007, the FDA gave accelerated approval for Avastin for breast cancer because the drug delayed cancer progression (a surrogate end point) as measured by X-rays, MRI, and other techniques (Tucker 2011). The price of Avastin was set at about $10,000/month (Tucker 2011; Workman et al. 2017). However, the FDA properly demanded follow-up breast cancer studies to confirm the value of the surrogate end point (delayed cancer progression), and in these controlled studies there was no increase in median survival. Moreover, in subsequent studies, there was also no improvement in median survival and no convincing data showing improvement in the quality of life (Tucker 2011). Therefore, with an overwhelming vote by the FDA advisory committee (against approving Avastin for breast cancer), the FDA rescinded its approval in 2011 based on lack of efficacy and the significant toxicity of Avastin. The Roche Company appealed the FDA decision and fought vigorously to retain its indication for breast cancer but lost (Tucker 2011). In its appeal of the revocation of licensure of Avastin for breast cancer, Tucker (2011) commented that the Roche Company employed patient and oncologist anecdotes. But Tucker (2011) pointed out that "anecdote is not science," and that "testimonials" conceal "the many patients who have been treated with Avastin but are not here to tell their stories. Serious progress will not be the result of polemics, lobbying or marketing."

So I would ask after ten years and the above data why Avastin is still used if it doesn't increase median survival (except possibly by two months or less in colon cancer), has substantial and serious side effects, and for its cost, has relatively little value (Workman et al. 2017).

I offer the following explanations based on the literature:

1) The original hype concerning the notion of "starving" tumors of nutrients is still bandied about;

2) Oncologists have an incentive to use this and other intravenous drugs because they supplement their incomes by infusing drugs (Smith and Hillner 2011);

3) Avastin in some cases causes shrinkage of tumors on X-rays, MRI, or CAT scans. This shrinkage can be very impressive to the patient and family. However, this often does not translate into improved median survival or improved quality of life except as noted above;

4) Hype often is translated (consciously or unconsciously) into hope; and

5) Patients, their families, and interest groups often press hard to do something—anything.

Unfortunately, Avastin for breast cancer is not the only example of a cancer drug approved initially based on surrogate end points (e.g., delay of time to progression of the cancer or tumor shrinkage by CAT or MRI scans) that did not turn out to save lives. From 2008 to 2012, thirty-six cancer drugs were approved based on surrogate endpoints (Kim and Prasad 2015). However, only five were subsequently proven to prolong life; eighteen did not, and for the remainder, any potential survival benefit remains unproven (Kim and Prasad 2015). Kim and Prasad (2015) state that "most cancer drug approvals have not been shown to, or do not, improve clinically relevant end points," (e.g., death). They conclude that the FDA has been approving "many costly, toxic drugs that do not improve overall survival. Enforcement of post-marketing studies is therefore of critical importance." Yet the FDA "has never exercised its authority to remove" the eighteen worthless products from the market as in the case of Avastin for breast cancer (Kim and Prasad 2015). Two years later, Bauer and Redberg (2017) emphasized that the FDA is not demanding rapid withdrawal of these worthless drugs as "outlined in the Federal Food, Drug, and Cosmetic Act."

A second recent instance of hype is exemplified by one of the newer biological drugs (antibodies) designed to stimulate

the immune system to kill cancer cells. These drugs have been the subject of intense interest on television and the Internet and in print media. One example is nivolumab (Opdivo), which must be given (like Avastin) by intravenous infusion.

In non-small-cell lung cancer (NSCLC) patients, the manufacturer's advertisement states (June 17, 2017; *Time* magazine) that: "This (Opdivo) is big. A chance to live longer." But what are the facts? In the first trial, described in smaller print in the advertisement, in patients who failed platinum-based chemotherapy, patients on Opdivo had nine-month median survival versus six months in controls; a net improvement of three months. In a second trial, lung cancer patients on Opdivo had a twelve-month median survival versus nine months for controls: again, a net increase of three months in median survival on Opdivo. So, in both trials, one half or more of the patients on Opdivo were dead within one year. Moreover, there are significant side effects due to Opdivo in these trials including pneumonitis, colitis, hepatitis, encephalitis, and hormonal unbalances apparently due to excessive stimulation of the immune system. The cost of this drug is about $10,000 per month (Workman et al. 2017).

Is this really "big" in lung cancer, taking into account the entire data set and cost? The company also presents no data supporting an improvement in the quality of life. Moreover, there are no data showing what happens to the patients when three-fourths of the control patients have died. Do the Opdivo patients still show an advantage, or, as has happened frequently with other drugs, is the median survival advantage lost? Are there any long-term lung cancer survivors on Opdivo versus controls? We don't know as of this writing.

The reader may ask, "Why is this not just a private issue between the patient and his or her oncologist?" The answer is in part because the government (Medicare, Medicaid, the VA system) pays for many of these drugs, so we taxpayers foot the bill (Smith and Hillner 2011). Therefore, all citizens have an interest in the "value" aspect of treatment (Workman et al. 2017). If Avastin and Opdivo are really marginal, why should the government support such expensive drug therapy? In a large controlled trial, hospice care led to "happier" cancer patients and better results than those subjected to heroic and expensive end-of-life chemotherapy (Temel et al. 2010).

The reader may also ask why many drugs and biologicals such as Avastin and Opdivo that initially, in some cases, spectacularly shrink tumors ultimately and spectacularly fail. Tentative answers have recently emerged. First, multiple investigators have shown that, even in the original tumor, the cells from different parts of the tumor are different, i.e., the genetic and/or epigenetic make-up and the packaging of the genome in chromosomes are different depending upon where the sample is taken (Jamal-Hanjani et al. 2017; Robles and Zenklusen 2017). (When I was a medical student at Yale in 1966, my preceptor [Professor Manuelidis] showed me there were different numbers of chromosomes in cells from the same tumor.) So although most of the cells are sometimes sensitive to the drug or biological, a few are not, and these then take over in a Darwinian sense and grow with vigor and abandon (Jamal-Hanjani et al. 2017). Metastatic lesions are even less stable (Jamal-Hanjani et al. 2017). As Hsu and Shaw (2017) say in their commentary "Lung Cancer: A Wily Genetic Opponent," "Therapeutic interventions that can limit tumor heterogeneity and reshape tumor evolution hold the key to improving cancer outcomes, including the most important outcome of survival." This, of course, is a huge challenge.

Thus, the notion often hyped (in so-called "personalized medicine") is that if you take a biopsy from one segment of a tumor and study it and then use drugs "effective" against the growth-promoting genes and their products in the biopsy, you can rationalize the therapeutic process. But as Hsu and Shaw (2017) and Robles and Zenklusen (2017) point out, even in different parts of the original tumor there are often profound differences in genetic, epigenetic, and chromosomal characteristics. Thus, a single biopsy and analysis will often be misleading.

Hype often is translated (consciously or unconsciously) into hope.

A second even more recent finding in cancer cells is the discovery of circular, non-chromosomal rings of DNA, now called the "circulome" (Pennisi 2017). These rings often contain multiple copies of genes (e.g., oncogenes) that drive cellular division and spread. The finding of the circulome "basically opens up a new field and a new way of thinking about how dynamic" DNA is in cells, especially cancer cells (Pennisi 2017). The nature and origins of the circulome are under intense investigation, but we do know that viruses in humans can cause cancer (e.g., cervical and liver cancer) amenable to protection by vaccines as noted earlier.

There are also other characteristics of some cancer cells, such as their ability to engulf and employ the genes in stem cells, but these complex activities are only now beginning to be understood.

In sum, notwithstanding the hype, there has been relatively little progress in treating lung cancer and the other major cancer killers in the United States in the past twenty years relative to heart disease and stroke; about 600,000 patients in the United States died of cancer in 2016 (Spector 2013; 2016; Mazaffarian et al. 2016).

Statin Therapy

An excellent example of negative hype is the widely misreported side effects (especially affecting muscle) of statin drugs. Dr. Harriet Hall (2017) has discussed this negative hype at length in her recent article in Skeptical Inquirer, "Statin Denialism." I will not repeat what she correctly

The statin drugs are unique; they are effective in saving lives from heart attacks and stroke with *beneficial effects that increase over time*.

points out but will make a few additional comments. The statin drugs are unique; they are effective in saving lives from heart attacks and stroke with *beneficial effects that increase over time*. (Full disclosure: I was in charge of development at Merck when for the first time in 1993 we showed that statins did not slow down coronary atherosclerosis by quantitative coronary angiography [Blankenhorn et al. 1993].) However, simvastatin did decrease deaths by about one-third (and also heart attacks and strokes comparably) in the blinded, randomized, placebo-controlled 4S trial in high-risk patients over five years (Scandinavian Simvastatin Survival Study Group 1994). It is now generally agreed—as promulgated in national guidelines (Spector 2013; 2016; Mazaffarian et al. 2016)—that all high-risk patients (e.g., those with a history of a heart attack, stroke, angina, or diabetes) should be treated with a statin (and aspirin) irrespective of their serum cholesterol. Statins benefit high-risk patients irrespective of the serum cholesterol. The notion of treatment to a cholesterol goal was a theory—now known to be incorrect. Current evidence suggests that the evaluation of risk, not serum cholesterol, is the important variable. (See Mazaffarian et al. 2016; Krumholz and Hayword 2010; Takagi and Umemoto 2013; Spector and Snapinn 2011; Spector 2013; and Spector 2016 for further detailed discussion of these points.) Simvastatin, now generic and very inexpensive, is the safest widely used statin (Naci et al. 2013) in the 20–40 mg dose range, and because of its proven safety and efficacy it is the drug of choice. (See below).

The primary mechanism of action of statins is to stabilize nonobstructing atheromatous wall plaques in open arteries so clots do not form on the plaques and obstruct blood flow to downstream tissue, thus preventing some heart attacks, strokes, and death. Aspirin also prevents arterial clotting although less effectively than statins. In patients with signs and symptoms of a heart attack or stroke, as quickly as possible, heroic efforts are made to find the "culprit" artery (i.e., the artery with the clot) and open it with either "clot busters" such as tissue plasminogen activator or mechanical means. If this is done quickly, cardiac or brain tissue distal to the clotted artery can be saved by reperfusion of the endangered tissue. It is worth noting that lowering serum cholesterol profoundly did not save lives in a two-year trial with a non-statin drug (Sabatine et al. 2017). In fact, there were slightly more deaths on that drug than on placebo although there were fewer heart attacks (Sabatine et al. 2017). This is consistent with previous data showing that lowering LDL cholesterol with very high doses of statins does not reduce mortality more than moderate doses (e.g., 20–40 mg simvastatin) (Spector and Snapinn 2011; Takagi and Umemoto 2013).

In summary, in controlled trials, doses of 40 mg or less of inexpensive generic simvastatin or atorvastatin show side effects comparable to placebo (Tobert and Newman 2016; Hall 2017). A very recent trial—the ASCOT-LLA trial—showed in the randomized double-blind portion no difference in muscle side effects of atorvastatin versus placebo (Gupta et al. 2017). But in the open extension (when the patients knew they were on drug), the patients voiced complaints about many "side effects" that they ascribed to the statin. The authors conclude:

> These analyses illustrate the so-called nocebo effect, with an excess rate of muscle-related AE reports only when patients and their doctors were aware that statin therapy was used and not when its use was blinded. These results will help assure both physicians and patients that most adverse effects associated with statins are not causally related to use of the drug and should help counter the adverse effect on public health of exaggerated claims about statin related side effects. (Gupta et al. 2017)

These new data further strengthen the arguments made by Hall (2017) and Tobert and Newman (2016) that there are minimal side effects associated with statin therapy at moderate doses. However, at doses of simvastatin and atorvastatin higher than 40 mg, there are in fact significant side effects, and such doses should only rarely be employed except in special situations (Spector and Snapinn 2011; FDA labelling of statins).

The reader might ask: Why has the varying inter-individual responses to various drugs (e.g., the statins discussed here) not been a major problem? This is because the drug industry, the regulatory bodies, and the public have bought into a scientific approach to drug development, registration, and sale—although in some cases the FDA has been very slow in carrying out its mandate and the law as noted earlier. The

science is based on large randomized (often blinded) controlled trials employing statistics and logic. The public has recognized that it is often difficult or impossible to identify which patients might respond to a treatment; therefore, the public accepts many patients may need to be treated for some to obtain the beneficial effect, especially if the drug has minimal side effects and is reasonably priced. With this approach, the FDA can assert with great confidence that Avastin does not prolong median survival in breast cancer patients and that simvastatin and atorvastatin do save lives and the life-saving effects increase over time. Moreover, Avastin has significant side effects whereas simvastatin and atorvastatin in the 20–40 mg daily dose range do not (Tobert and Newman 2016; Hall 2017). Unfortunately, as I have noted, there are still many oncology drugs on the market that have not been subjected to rigorous testing or that have not yet been removed from the market due to lack of clinically relevant efficacy (Kim and Prasad 2015; Bauer and Redberg 2017).

Conclusion

I have provided three significant examples of medical hype that matters. In some cases, hyping of new therapies is of no or minimal consequence. But in some situations, it greatly matters, and we must distinguish between true and hyped claims (e.g., the putative benefits of Avastin in breast cancer). The medical community, pharmaceutical industry, the regulatory bodies such as the FDA, and the public have brought the use of the scientific method into the development and registration of drugs. However, with some drugs such as statins, it took multi-year controlled trials to establish their safety and efficacy in preventing deaths (and heart attacks and strokes) and the proper way to employ them, i.e., use based on risk not serum cholesterol levels. However, although hype has been minimized in advertising prescription drugs, it still occurs. Is a two- or three-month increase in median survival in cancer therapy really "big" when taking into account the side effects and cost of the drug (Workman et al. 2017)? We are again back to definitional problems. In my view, we need a précising (Copi and Cohen 2009) definition of "big" in this situation. From my perspective, prolongation of life for years or a cure would be "big." A three-month or less increase in median survival with many serious side effects at great monetary cost is "small" in my view and that of others (Workman et al. 2017). "Big" in this context is hype. ■

Acknowledgement

I thank Michiko Spector for her many valuable points and her aid in preparing the manuscript.

References

Bauer, S.R., and R.F. Redberg. 2017. Setting the record straight on FDA approvals in oncology. *JAMA Internal Medicine* 177: 1223.

Blankenhorn, D.H., S.P. Azen, D.M. Mack, et al. 1993. MARS research group: The monitored atherosclerosis regression study. Coronary angiographic changes with lovastatin therapy. *Annals of Internal Medicine* 119: 969–976.

Copi I.M., and C. Cohen. 2009. *Introduction to Logic*. Pearson Prentice Hall: New Jersey.

Gupta, A., D. Thompson, A. Whitehouse, et al. 2017. Adverse events associated with unblinded, but not with blinded, statin therapy in the Angio-Scandinavian Cardiac outcomes Trial—Lipid-Lowering Arm (ASCOT-LLA): A randomized double-blind placebo-controlled trial and its non-randomized non-blind extension phase. *The Lancet Online*. Available online at http://dx.doi.org/10.1016/S0140-6736(17)31075-9.

Hall, H. 2017. Statin denialism. Skeptical Inquirer 41(3) (May/June): 41–43.

Hsu, P., and A.T. Shaw. 2017. Lung cancer: A wily genetic opponent. *Cell* 169: 777–779.

Jamal-Hanjani M., G.A.Wilson, N. McGranahan, et al. 2017. Tracking the evolution of non-small-cell lung cancer. *New England Journal of Medicine* 376(22): 2109–2121.

Kim, C., and V. Prasad. 2015. Cancer drugs approved on the basis of a surrogate end point and subsequent overall survival. *JAMA Internal Med* 175: 1992–1994.

Krumholz, H., and R. Hayward. 2010. Shifting views on lipid lowering. *BMJ* 341: 332–333.

Mozaffarian, D., E.J. Benjamin, A.S. Go, et al. 2016. American Heart Association Statistics Committee and Stroke Statistics Subcommittee: Heart disease and stroke statistics—2016 update: A report from the American Heart Association. *Circulation* 133: e38–e360.

Naci, H., J. Brugts, and T. Ades. 2013. The comparative tolerability and harms of individual statins: A study-level network meta-analysis of 246, 955 participants from 135 randomized controlled trials. *Circulation Cardiovascular Quality and Outcomes* 6: 390–399.

Pennisi, E. 2017. Circular DNA throws biologists for a loop: Studies hint at health and disease roles of unusual DNAs. *Science* 356: 996.

Robles, A.I., and J.C. Zenklusen. 2017. Seeing the forest through the phylogenetic tree. *New England Journal of Medicine* 376: 2190–2191.

Sabatine, M.S., M.P.H. Giugliano, and A.C. Keech, et al. 2017. Evolocumab and clinical outcomes in patients with cardiovascular disease. *New England Journal of Medicine* doi: 10.1056/NEJMoa1615664.

Scandinavian Simvastatin Survival Study Group. 1994. Randomized trial of cholesterol lowering in 4444 patients with coronary heart disease; the Scandinavian Simvastatin Survival Study (4S) *Lancet* 344: 1383–1389.

Smith, T.J., and B.E. Hillner. 2011. Bending the cost curve in cancer care. *New England Journal of Medicine* 364: 2060–65.

Spector, R. 2013. Efficacy and safety of statins: Focus on atorvastatin and simvastatin. *Journal of Symptom Signs* 2: 241–245.

———. 2016. New insight into the dietary cause of atherosclerosis: Implications for pharmacology. *Journal of Pharmacology and Experimental Therapy* 358: 103–108.

Spector, R., and S.M. Snapinn. 2011. Statins for secondary prevention of cardiovascular disease: The right dose. *Pharmacology* 87: 63–69.

Takagi, H., and I. Umemoto. 2013. Limits to benefits of large reductions in low-density cholesterol levels. *JAMA Internal Medicine* 173: 1028–1029.

Temel, J.S., J.A. Greer, A. Muzikansky, et al. 2010. Early palliative care for patients with metastatic non-small-cell lung cancer. *New England Journal of Medicine* 363: 733–742.

Tobert, J.A., and C.B. Newman. 2016. Statin tolerability: In defense of placebo-controlled trials. *European Journal of Preventive Cardiology* 23: 891-896.

Tucker, F.C. 2011. Drugs and profits. *New York Times* (May 25).

Wick W., T. Gorlia, M. Bendszus et al. 2017. Lomustine and bevacizumab in progrssive glioblastoma *New England Journal of Medicine* 377(20): 1954–1963.

Workman, P., G.F. Draetta, J.H.M. Schellens, et al. 2017. How much longer will we put up with $100,000 cancer drugs? *Cell* 168: 579–583.

Reynold Spector, MD, is adjunct professor of Medicine at Rutgers Robert Wood Johnson Medical School.

Twenty-One Reasons Noah's Worldwide Flood Never Happened

Here's a geologist's critical analysis of false perceptions held by many creationists about the origin of the Grand Canyon and the age of the Earth.

LORENCE G. COLLINS

Young-Earth creationists claim that the Paleozoic sedimentary rocks in the Grand Canyon and the Mesozoic sedimentary rocks of the Grand Staircase north of the canyon, in which Zion and Bryce Canyon National Parks occur, were deposited during Noah's worldwide flood about 4,500 years ago (Hill 2002; Hill and Moshier 2009). I realize that readers of Skeptical Inquirer accept modern scientific views on this subject, but this examination of the creationist claims might be useful when communicating with others less imbued with scientific thinking.

There are at least twenty-one scientific reasons a worldwide flood recounted in the Bible cannot have happened.

1. The stair-stepped appearance of erosion of sedimentary rocks in the Grand Canyon with sandstones and limestones forming cliffs and shales forming gentle slopes cannot happen if all these rocks were deposited in less than one year. If the Grand Canyon had been carved soon after these rocks were deposited by a worldwide flood, they would not have had time to harden into solid rock and would have been saturated with water. Therefore, the sandstones and limestones would have slumped during the carving of the canyon and would not have formed cliffs (Hill et al. 2016).

2. Salt and gypsum deposits, more than 200 feet thick, occur in the Paradox Formation in Utah just 200 miles north of the Grand Canyon, and these deposits are the same age as the Supai rocks in the Grand Canyon that were supposedly also deposited by Noah's flood. Similar salt deposits, up to 3,000 feet thick, exist in various places on all continents and

in layers of all geologic ages, and these deposits can only be produced by evaporation of sea water. Such evaporation could not have happened in repeated intervals in the midst of the forty days and forty nights of raining and during the supposed continuous deposition of sedimentary rocks by a worldwide flood and in which the only drying and evaporation is said to have occurred at the end of the flood (Collins 2006; 2009; 2012; Hill et al. 2016).

3. Sand dunes with giant cross bedding occur in the Mesozoic rocks in Zion National Park and are further evidence that desert conditions occurred at the time of the supposed flood (Senter 2011; Collins 2017).

4. Fossilized mud cracks occur in the Cambrian Tapeats Formation on top of the Precambrian Vishnu schist at the bottom of the canyon and indicate that drying conditions existed during the alleged worldwide Noah's flood, and these drying conditions occurred at the very beginning of this supposed flood. Although mud cracks can also form in mud under water by compression that squeezes out water from the mud, such compression is not likely to occur during a flood. Moreover, fossilized mud cracks are found in other formations that were supposedly deposited during Noah's flood, and these mud cracks occur in red shales that coexist with salt and gypsum layers. Therefore, these mud cracks were likely formed in deltaic mud flats that were exposed to the atmosphere where their iron-bearing minerals reacted with oxygen in the air to form red hematite (Collins 2006; Senter 2011; Hill et al. 2016).

5. Raindrop prints occur in many places around the world, which could not have been formed or preserved if the muds (now in shales) containing these prints were deposited under water during Noah's flood (Senter 2011; Hill et al. 2016).

6. Nests of dinosaur eggs are found in several places around the world, and it is illogical that dinosaurs could have had enough time to create these nests and lay their eggs while they were fleeing from rising waters to reach higher ground (Senter 2011; Hill et al. 2016).

7. The White Cliffs of Dover on the eastern coast of England consist of chalk layers, up to 350 feet thick, that are composed of fossilized coccoliths (a kind of algae), and these layers are the same age as the sedimentary rocks that overlie giant cross-bedded sandstones in Zion National Park. Therefore, they were supposedly also deposited by Noah's flood. But coccoliths are very tiny and have chloroplasts that require sunlight and must float close to the ocean surface to get energy from the sun. Because of this, all of them could not have been living at the same time to depths of 350 feet in the one year in which the flood is said to have occurred because that many organisms in the water at the same time would have blocked out the sun from organisms below the near-surface (Collins 2015a).

Coccoliths

8. Up to 4,590-foot thicknesses of radiolarians occur on the Pacific Ocean floor. Radiolarians are tiny marine organisms with silica skeletons; they contain chloroplasts and must float near the ocean surface to obtain sunlight. The rate at which dead radiolarians settle to the bottom of the ocean is too slow for that thickness and number of radiolarians to accumulate in the 4,500 years since Noah's flood. Although radiolarians are not found in the sedimentary rocks of the Grand Canyon, fossilized radiolarians are common in sedimentary layers in other parts of the world of the same geologic age, and each of these layers contains distinctly different radiolarian species that are among more than 4,000 different species that have been identified. Chaotic rushing waters of a tsunami in Noah's flood would have been unable to sort out these different species in different geologic ages from those living early in the flood to those created late in the flood (Collins 2015a).

I realize that readers of SKEPTICAL INQUIRER accept modern scientific views on this subject, but this examination of the creationist claims might be useful when communicating with others less imbued with scientific thinking.

9. None of the sedimentary rocks in the Grand Canyon contains fossilized pollen grains that are produced by grasses, pines, and flowering trees and plants, whereas these same rocks in the canyon contain only spores of algae, ferns, moss, and fungi. A worldwide flood would be expected to mix these tiny structures if all were alive at the same time of Noah's flood, and this mixing did not occur. How can a rush of water in a tsunami sort out and separate such tiny reproductive structures from each other? (Hill et al. 2016).

10. The Redwall limestone in the Grand Canyon contains billions and billions of jumbled sea lily (crinoid) fossils in multiple layers, and such marine animals would have had to grow on stalks on the ocean floor and cover the whole Earth at space intervals of one foot apart if all were alive at the same time during Noah's flood. That distribution and abundance is extremely unlikely in less than one year's time. Moreover, there would have been the need for already available, precipitated, calcium carbonate crystals somewhere to be carried into the Grand Canyon area to be deposited as limestone to host these fossils. This seems highly unlikely because the source of the calcium requires long periods (tens of thousands of years) of chemical weathering of calcium-bearing rocks, such

as basalt lava flows, to produce such a large volume of limestone that extends, not only in the Grand Canyon, but also in the Redwall limestone across most of western and central United States in buried sedimentary layers (Collins 2015a; Hill et al. 2016).

11. If all limestones were deposited by Noah's flood during a giant tsunami, then all limestone layers should show evidence of fossils being jumbled by rushing water. This is not the case. The presence of Silurian limestone layers that are older than the Redwall limestone occur with consistent sequences at constant thicknesses over hundreds of square miles in Illinois, Iowa, and Wisconsin, and they lack any fossils in a jumbled array. These consistent thicknesses indicate that these limestone layers could not have been deposited by a tsunami, and these layers could only have been formed in quiet water by slow chemical precipitation of the calcium carbonate during tens of thousands of years. Thus, the limestones around the world, alleged to be deposited by Noah's flood, were not deposited by a rush of flood water in a tsunami in less than one year. Many other examples occur in sedimentary rocks around the world where fossils of communities of many different marine animals are totally undisturbed (Senter 2011; Collins 2015a; 2017).

Raindrop prints occur in many places around the world, which could not have been formed or preserved if the muds (now in shales) containing these prints were deposited under water during Noah's flood.

12. Abundant fusain (charcoal) is found in several different sedimentary rocks around the world that were supposedly deposited by Noah's flood, which is good evidence that a worldwide flood never happened. Fires that burn forests are not likely to occur in the midst of forty days and nights of rain (Senter 2011).

13. River terraces exist on the sides of Colorado River canyon walls that give ages of deposition at the top of 350,000 years and at the bottom of 38,000 years, and these ages were determined by two entirely different methods and are much beyond the 4,500 years that young-Earth creationists claim is the age of the sedimentary rocks deposited during Noah's flood (Collins 2015b; 2017).

14. Scientific observations and measurements show that the canyon of the Colorado River was eroded by rates of 80 to 458 meters per million years at different places along the canyon (Collins 2015b; 2017).

15. The coarsely crystalline Zoraster granite occurs in the Vishnu schist in the bottom of the Grand Canyon. Experimental work shows that coarse crystals in granite are formed only at depths of five miles or more in the Earth's crust and that at these depths, the rate of cooling of rock melts (magma) at temperatures of more than 800 degrees C require at least 5 million years before temperatures are low enough that crystals can start to form and slowly increase in size. Therefore, the age of the Earth must be more than 6,000 years and much older than when Noah's flood supposedly occurred (Collins 2017).

16. The rate of erosion of the Zoraster granite in the floor of Colorado River in Grand Canyon, as measured by how fast the erosion occurs on a yearly basis from year to year, is about a thousandth of an inch per year. This means that the carving of the Grand Canyon took millions of years—not less than a year in a sudden rush of water draining from three lakes at the end of Noah's flood (Collins 2017).

17. The average thickness of sedimentary rocks around the world in the continents that were supposedly deposited by Noah's flood is about 1,800 meters (5,905 feet) (Nelson 2012). If just 1 percent of this thickness represents fossil remains of marine animals that were alive at the same time during Noah's flood, then the whole world would have been covered with 590 feet of living marine animals, such as clams, snails, corals, trilobites, and sponges. That many animals living at the same time during that single year would have been impossible. The value of 1 percent is not unreasonable when some limestone layers are composed of nearly 100 percent fossils. Even if 0.1 percent of the sedimentary rock thickness contained all marine animals that were alive at the same time in the year of Noah's flood, that means that the whole world would have been covered with fifty-nine feet of animals, and that still is too many animals. The impossible numbers of fossils of coccoliths (Reason 7), radiolarians (Reason 8), and sea lilies (Reason 10), are illustrative of this fact. Moreover, if only one out of 10,000 animals living on the land (amphibians, reptiles, birds, and mammals) are preserved as fossils in the sedimentary rocks deposited by Noah's flood, then Noah would have had no space in which he, his family, and cattle could have existed with all these creatures living at the same time, particularly if tens of thousands of huge dinosaurs were alive when Noah lived prior to the flood.

18. An experiment done by Charles Munroe III shows that the submergence of an olive tree under water for more than three months kills the tree. On that basis, when a dove brought an olive twig with fresh leaves to Noah on the ark (Genesis 8:11), the whole world could not have been submerged under water during the flood. Otherwise, all olive trees would have been killed in six months of their submergence under the flood waters. Therefore, the flood must have been local in southern Mesopotamia with some land (say, 100 feet above water) present on which olive trees must have been growing and from which an olive tree with such a twig with fresh leaves could have been obtained by the dove (Collins 2017).

19. Wave action at high tide from a powerful category 5 hurricane with sustained winds of more than 156 mph can move an offshore barrier sandbar as much as 50 to 100 feet inland toward the continent, but such a major storm never moves sand for distances of thousands of miles across the United States, as creationists claim for the Tapeats, Coconino, and other sandstone deposits in the Grand Canyon or the calcite grains and fossils in the Redwall limestone. Therefore, producing such deposits by such winds and waves in Noah's Flood has no scientific support. Noah's ark could not have survived such wind power and large waves. Moreover, moving water cannot carry such large, suspended sediment loads for that distance (Collins 2015a; 2017).

20. The claim that the erosion surface that underlies the Cambrian Tapeats sandstone on top of the Precambrian basement rocks, which forms a major unconformity at the bottom of the Grand Canyon, was caused by a tsunami makes no scientific sense. A tsunami-created wave is caused by either a) a large earthquake following a sudden fault movement that shifts the position of the ocean floor; or b) a giant explosion of a volcano in an oceanic region, such as the explosion of Krakatoa—but never by flood waters of a large wave washing across the continent for thousands of miles. No such huge earthquake or explosion of a volcano is mentioned in the Bible, so postulating a tsunami to cause widespread rapid erosion across the world and at the bottom of the Grand Canyon at the beginning of Noah's Flood is without biblical or scientific support (Collins 2017).

21. If the sedimentary rocks in the Grand Canyon were all deposited by Noah's worldwide flood, then these rocks should all be deposited in less than one year *under water* and show continuous deposition from one formation to the next up the canyon walls without disruption. But that is not the case. For example, the Redwall limestone formation has ancient karst topography with caves and sinkholes, indicating that this formation was once lifted out of the water so that percolating rain water dissolved out cavities and tunnels in the limestone; erosion channels of the Temple Butte Formation, as much as 100 feet deep, cut the top of the Muav limestone, and networks of channels of the Surprise Canyon Formation, up to a half mile wide and 400 feet deep, cut the top of the Redwall limestone, indicating that these rocks were exposed at the Earth's surface to river erosion (Hill et al. 2016). These structural land *surface* features would take much more than one year to be formed.

A Reasonable Possibility

Thomas H. Huxley (1825–1895) said the following: "The great tragedy of science—the slaying of a beautiful hypothesis by an ugly fact." Any one of the above twenty-one facts destroys the idea that Noah's flood was a worldwide occurrence. Nevertheless, a local large flood in Mesopotamia in biblical times could have been possible (Collins 2009). Young-Earth creationists commonly point out that Jesus supported the existence of Noah's flood (Luke 17:27; Matthew 24:38–39), but in the context of the time in which Jesus lived, the translation of the Hebrew word *ertz* would have been understood as "land" and not the whole world. In that sense, all the land that Noah could have normally seen would have been under water in that part of Mesopotamia and that would have been in effect his whole world. During large floods in Iraq (Mesopotamia), commonly abundant rain falling in the adjacent Zagros Mountains goes underground in solution tunnels in limestone beds and emerges as gushing water in springs in Iraq. These springs are likely the "fountains of the great deep" as described in Genesis 7:11 (Hill 2015). ■

References

Collins, L.G. 2006. Time to accumulate chloride ions in the world's oceans. Creationism's young Earth not supported. *Reports of the National Center for Science Education* 26(5): 16–24. Available online at http://www.csun.edu/~vcgeo005/collins.pdf.

———. 2009. Yes, Noah's flood may have happened but not over the whole earth. *Reports of the National Center for Science Education* 29(5): 38–41. Available online at http://www.csun.edu/~vcgeo005/Collins2.pdf.

———. 2012. More geologic reasons Noah's flood never happened. *Reports of the National Center for Science Education* 32(6): 1–11. Available online at http://www.csun.edu/~vcgeo005/Collins3.pdf.

———. 2015a. Can flood geology and catastrophic plate tectonics explain sedimentary rocks? Available online at http://www.csun.edu/~vcgeo005/Collins5.pdf.

———. 2015b. When was Grand Canyon carved—millions of years ago or thousands of years ago? How do we know? *Reports of the National Center for Science Education* 35(4): 2.1–2.8. Available online at http://www.csun.edu/~vcgeo005/GrandCanyon.pdf.

———. 2017. When was the Grand Canyon formed? 4,360 years ago during Noah's flood? Or during millions of years by natural geologic processes. Power point presentation available online at http://www.csun.edu/~vcgeo005/PwrPt1.pdf and http://www.csun.edu/~vcgeo005/PwrPt2.pdf.

Hill, C. 2002. The Noachian flood: Universal or local? *Perspectives in Science and Christian Faith* 54(3): 170–183. Available online at http://www.csun.edu/~vcgeo005/Carol%201.pdf.

———. 2015. *A world view Approach to Science and Scripture* (unpublished book).

Hill, C., G. Davidson, T. Helble, et al. (editors). 2016. *The Grand Canyon—Monument to an Ancient Earth – Can Noah's Flood Explain the Grand Canyon?* Kregel Publications.

Hill, C., and S. Moshier. 2009. Flood geology and the Grand Canyon: A critique. *Perspectives in Science and Christian Faith* 61(2): 99–115. Available online at http://www.csun.edu/~vcgeo005/Carol%202.pdf.

Nelson, S.A. 2012. Geology 212, petrology. *Occurrence, Mineralogy, Texture, and Structures of Sedimentary Rocks*. Available online at http://www.tulane.edu/~sanelson/eens212/sedrxintro.htm.

Senter, P. 2011. The defeat of flood geology by flood geology. The ironic demonstration that there is no trace of the Genesis flood in the geologic record. *Reports of the National Center for Science Education* 31(3): 1–14. Available online at http://www.csun.edu/~vcgeo005/Flood%20geology.pdf.

Lorence G. Collins is a retired professor of geology from California State University Northridge. He has thirty-six articles on the website Opposition to Creationism (http://www.csun.edu/~vcgeo005/creation.html) that describe various views of young-Earth creationists and their scientific errors in interpretations. Among these are three articles that discuss a bogus fossilized Noah's ark in eastern Turkey.

Colin Wilson's Idiosyncratic Literary Legacy

Rather than creating a glorious new literature of positive art, Colin Wilson delivered an odd mix of dodgy philosophy, pulp novels, and paranormal studies—the latter often downright silly.

BRETT TAYLOR

Colin Wilson burst onto the paranormal scene with *The Outsider* in 1956, and his reputation and public image have been on a slow decline ever since. Some of his 118 books sold well, and some didn't. Wilson, a self-taught laborer who wrote his way into the literary scene and grew to be yet another example of the English eccentric—mild mannered but obviously idiosyncratic—was clearly an odd duck.

Gary Lachman, author of a 2016 book about Wilson (*Beyond the Robot: The Life and Work of Colin Wilson*, Tarcher Perigee, New York) is also a rare bird, since few musicians have thrown away rock stardom in order to study the occult. An original member of the New Wave band Blondie, he gave up rock and roll to research the paranormal and eventually write a number of books on esoteric subjects, including biographies of the usual oddball thinkers including Jung, Swedenborg, Madame Blavatsky, and Aleister Crowley.

Lachman bills *Beyond the Robot* as a "rediscovery" of Colin Wilson. In spite of the title, it is mainly Wilson's work being studied here. Many pages are spent explaining his philosophical ideas, while his life is often overshadowed. Though Lachman has known Wilson's widow and two sons for years, they often seem like peripheral figures, and the subject seems to have been completely absorbed by his work, in more than one sense.

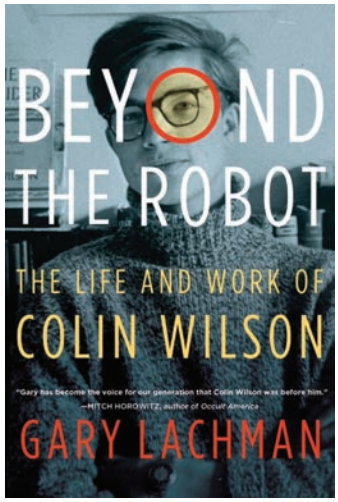
Overall, I enjoyed Lachman's biography, but a more critical author might have written a book that argued for the subject's worth in a broader and more convincing context. Lachman displays credulity on occult matters and an admiration for Wilson's sometimes dodgy philosophy. Among other preoccupations, he has absorbed Wilson's stylistic tendency to use italics to imprint some salient point or another on the

Colin Wilson

Lachman displays credulity on occult matters and an admiration for Wilson's sometimes dodgy philosophy.

consciousness of the reader. Actually, Lachman utilizes italics more than Wilson did, but the stylistic tendency nonetheless has the *effect of recalling the late author's style* even if the usage is not always exactly the same. For someone who resented public interest in his private life, Wilson had no problem disclosing juicy tidbits about the lives of dead authors, and here Lachman does the same. Do we really need to read about the fondness author Kingsley Amis had for smacking women directly on the anus? Especially in a book that tells us so little of the private life of its subject?

Both author and subject place a great deal of importance on coincidence. This is basically the same old Jungian synchronicity, and Wilson's fascination with it is more than a little ironic for someone who dismissed Jung so easily. One biographical anecdote finds Lachman recounting, without any apparent amusement or irony, an incident in which Wilson harnessed the power of his right brain in order to deliver producer Dino De Laurentiis an uncredited rewrite on the campy *Flash Gordon* remake. Lachman seems to find some vague significance in the fact that the *Flash Gordon* script deals with one of Wilson's favorite preoccupations, the right-brain/left-brain conflict. But the simple explanation is that Wilson personally inserted this theme into the script.


BEYOND
THE ROBOT
THE LIFE AND WORK OF
COLIN WILSON
"Gary has become the voice for our generation that Colin Wilson was before him."
—MITCH HOROWITZ, author of Occult America
GARY LACHMAN

Whatever one thinks of Wilson, it seems obvious to say that his "new existentialism" failed to supplant the old existentialism in the philosophy canons of most universities. Wilson's "peak experience" was borrowed from Abraham Maslow and was basically the same concept that Kant had previously termed "the sublime." I think this is the main reason Wilson is not widely remembered today—he was more an analyzer of previous philosophies than a blazingly original thinker. Wilson promised nothing less than a heightened new direction in human consciousness. Yet Wilson's results in this direction were somewhat meager. Wilson claimed he could use his willpower to experience changes in consciousness, but what impact this ability had on his own life and career is rather vague, to say nothing of how the human race benefitted from it. As for achieving this heightened consciousness, Wilson's techniques of breath control and meditation would be nothing new to anyone familiar with Asian religions.

It is perhaps not so much Wilson's insistence on his own genius that is his most annoying trait but rather his tendency to disdain the work and philosophy of the greatest minds of literature with an appallingly casual sense of ease. Wilson disliked the work of Samuel Beckett and was critical of Graham Greene, but at least he was sensible enough to be polite to these authors when he met them. With Eugene Ionesco he didn't even bother with pleasantries. Wilson began his career by calling out these greats on their failings and by promising to counter their pessimistic leanings with a newer and more positive philosophy. The bohemians of the sixties branched off into three directions. Some chose the Huxley path and sought expanded consciousness through drugs. Wilson detested mescaline after one sole experiment with it, and he claimed he could invoke the psychedelic state of mind without drugs, simply by concentrating on a radish. Clearly we are dealing with an advanced state of mind, as Wilson would have you think, or perhaps just someone with mild schizophrenia.

Then there was the path of political change, which Wilson rejected. Wilson abandoned socialism in his youth. In later years he endorsed Margaret Thatcher only to abandon this position as well. Lachman takes Wilson at his word in claiming to have no strong political opinions, but I wonder about this. A man with no political opinions is unlikely to edit a book titled *Marx Refuted*, as Wilson did in 1987. Forsaking drugs and politics, Wilson chose the path of inner enlightenment, which is not a bad thing in and of itself, but which has a way of encouraging self-absorption. The primary question that dominated his writing—How can troubled intellectuals avoid boredom and find happiness?—seems a bit elitist and somewhat shortsighted when you consider all the problems of the world.

I think this is the main reason Wilson is not widely remembered today—he was more an analyzer of previous philosophies than a blazingly original thinker.

But rather than creating a glorious new literature of positive art, Wilson went on to write flaky (though sometimes entertaining) books on the paranormal. Wilson scoffed at much occult literature as lowbrow trash and sought to bring "reason" to the occult field. But Wilson's idea of deductive logic was noticeably backward. It is obvious from *The Encyclopedia of Unsolved Mysteries*, cowritten with son Damon, that Wilson began every occult "investigation" by granting credence to any supernatural concept that came his way. It was this fuzzy kind of "logic" that allowed Wilson to accept the possibility of the Loch Ness monster and the like. Reading Wilson's work in the paranormal field is a frustrating experience. For any rational reader, it is infuriating to see a man

of such intelligence wasting his brilliance on theories about Yeti, psychic vampires, and the Cottingley fairies. Yet at least this book makes an amusing reference work, however gullible. When Wilson devoted his time to writing entire books on such subjects as Atlantis or the proven fraud Uri Geller, the results were simply tiresome to those not enchanted or fooled by the subject matter.

Once praised by the likes of Cyril Connolly, the author of *The Outsider* ended up writing pulp novels such as the *Spider World* series, in which the barbarians of a postapocalyptic Earth battle to overcome their arachnid overlords. Wilson promised great things, but what he delivered was an odd mix of pulp novels and paranormal studies—the latter often downright silly. Here was an author who had no qualms about disdaining any noted author he found overly pessimistic, be it Kafka or Sartre, but who quickly succumbed to a kind of intellectual soft headedness, rushing off in the direction of any and every supernatural fad. By contrast, Lachman is particularly dismissive of Wilson's true crime studies, which at least have the advantage of being grounded in recorded fact.

Colin Wilson claimed he could invoke the psychedelic state of mind without drugs, simply by concentrating on a radish.

Lachman digs up an old dispute between Martin Gardner of CSICOP (now the Committee for Skeptical Inquiry), and he expresses dismay that the paranormal periodical *Fortean Times* has taken an increasingly skeptical tone since its initiation. He expresses dismay that the English are a more skeptical lot than their Yank counterparts, which seems to me like a mark in favor of the English. He even claims to have gotten into "skirmishes" in which he found himself defending Wilson in pubs. The notion of the former rocker being forced to defend his idol's views on the paranormal with fisticuffs strikes me as irresistibly comic. I like to think the ruffians Lachman battled were attired with bicycle caps and shabby overcoats in the best Andy Capp tradition, and I strongly suggest that the recreation of these encounters would make a fine framing device for a BBC telefilm of Wilson's life, should one ever be made.

Will Lachman succeed in reviving and improving Wilson's reputation? It seems a bit doubtful. In a way, Wilson's semi-prudery is a kind of highbrow alternative to religious moralism. He was critical of so-called sexual perversions such as S&M, not because they were immoral but because they were a waste of time and energy in his estimation. This seems to be a highly subjective judgment, since even Wilson was at a loss to find a definitive definition of what exactly "perversion" is. Further, I am unaware of any scientific proof of the Wilsonian conviction that perversion eventually becomes boring and disappointing to those who try it. The mainstreaming of such so-called alternative lifestyles as homosexuality and S&M makes the tsk-tsking in Wilson's *The Misfits: A Study of Sexual Outsiders* look fustier than ever. And modern psychiatry has shed much light on the chemical roots of depression and mental illness, making it easy to speculate that many of the artists and thinkers Wilson critiqued were victims of bipolar disorder or other mental disorders rather than their own philosophical failings. The philosophical trends of the sixties bent in the direction of deconstructionism, and Wilson bristled to see the likes of Jacques Derrida, rather than his own ideas, being studied at the universities. In many ways, Wilson's self-proclaimed optimism and emphasis on the pull-yourself-up-by-your-bootstraps work ethic had more in common with popular psychology than with any well-developed existentialism, old or new. Even as Wilson was quick to criticize such seeming forbears as Freud and Jung, he saw fit to note approvingly that Norman Vincent Peale had spotted something Freud had overlooked, namely optimism. This was surely a highwater mark in highbrow acceptance for the author of *The Power of Positive Thinking*.

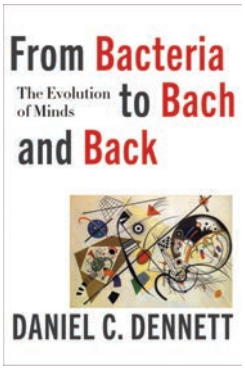
Wilson's novels are, at the least, unique. These books, in which heroes who resemble more dynamic versions of the author square off against sex criminals and super aliens through metaphysical debate and philosophical digression, are either clever re-imaginings of lurid thriller formats as vehicles for serious thought or simply the most pseudo-intellectual potboilers on record. The novels accomplish the weird trick of describing luridly outrageous scenarios in a style that is cerebral and professorial. Lachman considers Wilson to be a trailblazer in that he turned the detective format into a philosophical-postmodern genre, though I would point out that Borges had already pioneered this idea to some extent in *Death and the Compass*.

I see Wilson as a fine example of the classic English oddball who could have emerged from a Peter Cook comedy sketch. Indeed, it is an amusement of such figures that allows me to enjoy much of Wilson's work even while I am dismayed by his lapses in judgment. I understand that Lachman's point of view is different, and I liked reading his biography. But I still think a more well-rounded biography could have been achieved by placing the late author in a more critical context. Given that Wilson was basically to blame for trapping himself into an occult corner, it is perhaps no surprise this has not happened. ■

Brett Taylor is a writer whose work has appeared in film and literary journals such as *South Carolina Review* and *Filmfax*. He wrote "Hollywood Curse Legends" in our November/December 2017 issue.

The Riddle of Consciousness

HARRIET HALL



From Bacteria to Bach and Back: The Evolution of Minds. By Daniel C. Dennett. W.W. Norton, New York, 2017. ISBN: 978-0-393-24207-2. 496 pp. Hardcover, $28.95; softcover, $18.95.

For most of human history, people have assumed that some kind of vitalistic essence had to be added to matter to produce life. The belief in an immaterial soul was pervasive. At one point, a scientist even tried to weigh the soul by weighing a body right before and after death, expecting to find a decrease when the soul departed (see Benjamin Radford's column in the Skeptical Inquirer "Measuring Near-Death Experience," May/June 2007). For most people, it is almost inconceivable that a purely material brain could produce consciousness. It is all too easy and appealing to imagine that consciousness is an immaterial essence that can survive death or to resort to the cop-out that "God did it." And we are appalled by the idea that a materialistic account of consciousness might abolish free will and moral responsibility for human actions.

Philosopher Daniel Dennett's new book *From Bacteria to Bach and Back: The Evolution of Minds* goes a long way toward illuminating these conundrums with facts and arguments from evolution and neuroscience.

Dennett warns that in trying to understand consciousness, "We mustn't let our moral intuitions distort our empirical investigation from the outset."

Insights from Evolution

We are beginning to understand how "a process with no Intelligent Designer [evolution] can create intelligent designers who can then design things that permit us to understand how a process with no Intelligent Designer can create intelligent designers who then design things."

Biology is reverse engineering; we must ask "What has happened?" rather than asking "why" a feature evolved because no intentional purpose was involved.

Organisms have developed spectacular competencies without any need for comprehension. Some animals (for instance, crows) demonstrate a degree of intelligence and problem-solving that is more powerful than simple trial and error, but this can be accomplished by unconscious processes. If unconscious processes can accomplish so much, *What is consciousness for*? Why do we need conscious comprehension? How could it have come about, and how has it benefited the human species?

Dennett says, "Brains are more like termite colonies than intelligently designed corporations or armies." Evolution "designed" the brain through a bottom-up process rather than a top-down intentional design. Animals can do things for reasons without having any comprehension of those reasons. Humans can articulate reasons for what we do; they may be self-deceptive reasons, but we "own" them.

Language and Other Memes

Memes are "an element of culture that may be considered to be passed on by non-genetic means." They have their own reproductive fitness. Words are memes that can be pronounced. Like genes, words are informational structures that determine ways of doing things. They are not necessarily discrete and may not be faithfully transmitted. Just as there are typos in printing, there are transmission errors in memes. In computer jargon, a "thinko" is like a typo—a clear mistake or bug in programming. There are standards that allow for correction. Like genes, memes can mutate; transmission errors can lead to extinction of the meme or can serendipitously result in a better meme. Like viruses, memes can spread without being noticed or consciously approved. There is no way to predict how genes or memes will evolve.

As a thought experiment, Dennett asks us to consider: If you believe no one is ever responsible for what they do, would you abolish all the penalty rules in sports?

Language may have originated as inefficient behavioral patterns. As it progressed, it may have been driven more by its benefits to memes than by its benefits to speakers. Today it has evolved into a remarkable tool that enhances human communication and productivity far beyond anything other animals have achieved. Other social animals might make spectacular use of language if they had it: "Somehow our languageless ancestors stumbled onto a rare path to this treasure and myopically followed it, getting some advantage along the way, or at least not losing ground, until they hit the jackpot," Dennett writes. Why humans and not other animals? It must have been preceded by prelinguistic cultural transmissions of some sort (cooperation and imitation boosted survival fitness), but the rest can be ascribed to chance. Words are the best memes, but they were not the first memes. There are many hypotheses about why humans were more likely than other social animals to develop culture and language, including bipedality, manual dexterity for toolmaking, and the theory of mind.

Competition may have been a more powerful driver than cooperation. Confirmation bias (highlighting positive evidence for our beliefs and ignoring negative evidence) suggests that certain patterns of errors in human reasoning were honed for persuading others in debate, not necessarily for getting things right.

The development of language enabled *cumulative* cultural evolution. It was the launching pad of human cognition and thinking, and it has allowed us to transform the environment we live in. Writing—preserving a record of a thought outside the brain—was critical to the development of "the extended mind."

Consciousness Is an Illusion

Consciousness and free will are real, but they are not what people think they are. This is akin to currency. Dollars are also real, but the actual dollar bill is only a token to represent an idea that everyone has agreed upon. Credit card transactions deal in dollars without actual dollar bills.

Consciousness is *not* a nonphysical phenomenon. It is an evolved user-illusion, "a system of virtual machines that evolved, genetically and memetically, to play very special roles in the 'cognitive niche' our ancestors have constructed over the millennia." There can be competence without comprehension, and comprehension is expensive, so nature uses the "need to know" principle. Most animals don't need to know. Are there degrees of consciousness? Where might we draw a line? We draw a line for moral reasons and try to prevent animals from suffering, but what is suffering? We euthanize dogs when we think they are conscious of suffering, but do fish suffer? Do mosquitos suffer? We are willing to exterminate rats but not squirrels; why? Dennett warns that in trying to understand consciousness, "We mustn't let our moral intuitions distort our empirical investigation from the outset."

It's hard to understand how uncomprehending neurons could give rise to comprehension, but they do. We can think about reasons and let these reasons influence our behavior, something no other animals can do. "We can perform many quite adroit and *retrospectively* justifiable actions with only a vague conception of what we are up to, a conception often swiftly sharpened in hindsight by the self-attribution of reasons."

"Our thinking is enabled by the installation of a virtual machine made of virtual machines made of virtual machines." We are only aware of the user interface, not of the intricate underlying details. The advantage of the user interface is that it allows us to make our competencies somewhat accessible to other people, and then we get to use them ourselves as "guests in our own brains." We can explain ourselves to others and to ourselves.

Dennett quotes ethologist and roboticist David McFarland: "Communication is the only behavior that requires an organism to self-monitor its own control system." Self-monitoring allows an organism to avoid revealing too much about its current state to competitors. Communication may be more grounded in deception and manipulation than in cooperation.

We have the illusion of a "self," but this self has limited access to what is happening in the brain. Consciousness simplifies things for our benefit;

an awareness of all the underlying operations would hopelessly clutter our minds and would only handicap us. We only have access to the results of underlying brain processes, and we confabulate a model to explain what we think has happened. Our first-person reports could be wrong, and there are ways to examine consciousness from a second-person viewpoint. A more objective approach may show you features of your own experience that you were not aware of.

We have an inborn propensity to see causation; we attribute our perceptions to external causes, but some perceptual representations are internal, for instance optical illusions.

Descartes was a dualist who believed an immaterial soul animated the brain. He didn't know what we know today about neurophysiology. He could only imagine a mechanical model of the brain with wires, pulleys, or hoses, so he jumped to the conclusion that thinking must involve something additional that was immaterial. He relied on introspection without realizing how unreliable it was.

Dennett notes that "Human consciousness is unlike all other varieties of animal consciousness in that it is a product in large part of cultural evolution, which installs a bounty of words and many other thinking tools in our brains, creating thereby a cognitive architecture unlike the 'bottom-up' minds of animals." It is a user illusion that gives us limited access to the workings of our brains and thereby empowers us to be intelligent designers of artifacts and of our own lives.

Dennett says that the so-called "hard problem" of consciousness research, explaining the "qualia" of subjective experience, vanishes when you realize that it is "nothing but an artifact of the failure to recognize that evolution has given us a gift that sacrifices literal truth for utility."

Free Will Is an Illusion

Free will is *not* a phenomenon isolated from causation; it is instead an illusion. We feel that we chose freely, but our choice was determined by unconscious processes before we were aware of choosing. Dennett quotes Wegner: "The experience of will, then, is the way our minds portray their operations to us, not their actual operations."

Free will is not an illusion we would want to get rid of; "it's where we live, and we couldn't live the way we do without it." Dennett thinks our systems of morality and justice should "punish when punishment is called for, but with a profoundly different framing or attitude." As a thought experiment, he asks us to consider: If you believe no one is ever responsible for what they do, would you abolish all the penalty rules in sports?

Dennett is always worth reading, and this latest book distills his current thinking and all he has learned over the years.

Distributed Comprehension and the Future

Some people think consciousness is one of those mysteries we can never hope to solve rather than a scientific problem to be solved. Dennett argues that we may eventually be able to solve it because of all the tools that multiply our cognitive powers and because of the possibility of "distributed comprehension." In science and technology today, individuals comprehend only a part of the whole, but as a group, humans can understand things too complex for any individual to master. We understand how to drive our cars, but most of us don't understand how to fix them if they break, and few understand the functioning of all the related systems that make driving cars possible, including auto manufacturers, oil refineries, highway construction, insurance companies, the government, etc. "This distribution of partial comprehension is not optional. The edifices of social construction that shape our lives in so many regards depend on our myopic confidence that their structure is sound and heeds no attention from us." He says, "We have bootstrapped ourselves into the heady altitudes of modern civilization, and our natural emotions and other instinctual responses do not always serve our new circumstances."

With computers, we can create things we only partially understand, things that in turn may create things we don't understand at all. Dennett imagines a future textbook on consciousness encompassing neuroscience, psychology, philosophy, and other fields; no reader could claim to have mastered all the levels of explanation.

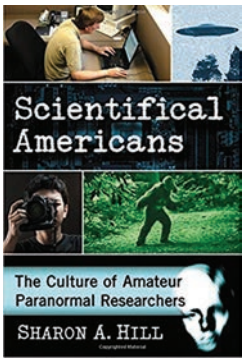
Dennett is always worth reading, and this latest book distills his current thinking and all he has learned over the years. It's not a book you would take to the beach for light summer reading; it challenges the reader to think seriously about a variety of subjects. But it's well written and accessible to the general reader, and it's a great way to get a better understanding of how consciousness works and how it came about. ■

Harriet Hall, MD, a retired Air Force physician and flight surgeon, writes and educates about pseudoscientific and so-called alternative medicine. She is a contributing editor and frequent contributor to the Skeptical Inquirer and contributes to the blog *Science-Based Medicine*. She is author of *Women Aren't Supposed to Fly: Memoirs of a Female Flight Surgeon* and coauthor of the 2012 textbook *Consumer Health: A Guide to Intelligent Decisions*.

Strange Songs from the Fringe

BRIAN REGAL

When odd birds sing their strange songs, does it change the forest? Do others, who don't know any better, mimic those songs until the forest is filled with dissonance? This is an important question when it comes to science, history, and scholarship in general in Trump-era America. We used to be able to notice the odd birds, think them interesting or not, then move on to proper work based upon facts and evidence. Now the highest echelons of our government tilt their ears to hear the weird peeping and smile in agreement. Sharon Hill's new book *Scientifical Americans: The Culture of Amateur Paranormal Researchers* addresses this issue at an important time.



Scientifical Americans: The Culture of Amateur Paranormal Researchers. By Sharon Hill. McFarland, Jefferson, N.C., 2017. ISBN-13: 978-1476672472. 277 pp. Kindle edition, $18.99; paperback, $35.

Chasing enthusiasts of the paranormal is like chasing ghosts. They flit about and reside in the darkened corners of rationality.

Chasing enthusiasts of the paranormal is like chasing ghosts. They flit about and reside in the darkened corners of rationality. When they do appear we almost need to look at them from the corner of our eyes rather than directly, as a direct view doesn't really provide clarity. Despite this, Hill has done an excellent job of analyzing the myriad realms and compartments of paranormal studies. What ties them—and this book—together is their attempts to pursue their quarry according to the rules of academic science and scholarly research despite most of them having little more than a nodding acquaintance with it. The results, sometimes serious and sometimes ridiculous, are what bring us to the notion of them being "sciencey." One way historians define pseudoscience is that practitioners give a superficial gloss of science to their work though it is not really proper science. Their results are, as Hill says, *scientifical* rather than scientific. They separate themselves consciously from the mainstream, but they also self-segregate into different disciplines. There is little interdisciplinarity in the world of sciencey studies; UFOlogists, for example, rarely sit down with ghost hunters or flat-Earthers to compare notes.

Hill traces these scientifical belief systems through pop culture, film, TV, and of course the Internet, which she holds up as the prime enablers of such thought. So many of the scientifical Americans began to ponder the fringe and paranormal after being exposed to various television programs and films. Her focus here is primarily upon the big three of modern paranormal interest: monsters, UFOs, and ghosts. She does not address wider pseudoscientific ideas such as climate denial or anti-vaccination theory. She also avoids spiritualism, witchcraft, or other operative occult practices (though that would make an interesting follow-up companion volume). Using case studies of paranormal investigation practitioners, Hill attempts to explain the lure of the paranormal and the attempts—largely unsuccessful—to prove the existence of these phenomena through ersatz scientific practice and instrumentality. Indeed, the bulk of sciencey practice rests upon the mistaken notion that technology in various forms—from EVP meters, infrared night-vision goggles, and motion sensors—equates with science.

Hill resists the obvious temptation to ridicule her subjects. This isn't always easy when one of the underlying, perplexing, and contradictory threads of thought here is that while the paranormalists try to be scientific and behave as scientists, they generally reject the scientific mainstream and real scientists—especially those who disagree with their findings—as part of a wider cabal of sinister characters out to suppress awareness of giants, ghosts, and spirit orbs. There is also little discussion among the paranormal investigators of the more philosophical and theological aspects of their work. Ghost hunters and cryptozoologists rarely engage

with the epistemological conundrum of ghosts or Bigfoot, respectively. What is a ghost? If there are ghosts, what does this say about the existence of an afterlife? Does one's religion in life determine if they can become a ghost in death? If Bigfoot is real, how does it fit into the wider scheme of biological diversity? These types of questions are rarely asked by those snooping around a creepy old building with a tape recorder hoping to capture ghostly voices.

One of the many bonuses of this book is that Hill provides a historiography of the field. The different authors of skeptical and historical works on the subjects she discusses make advantageous further reading. She knows the current secondary literature. I would have liked more primary sources and use of works by believers to examine how they came to their positions. A critique of the wider world of skeptical thinking suffers a bit from not allowing the original texts to speak as part of analyzing them.

While monsters, ghosts, and UFOs are the pivot around which this study turns, Hill pays special attention to what she calls "ARIGs" (Amateur Research and Investigation Groups). In this she has made a useful contribution to the field. Along with the individuals, there are many groups of like-minded enthusiasts who band together to pursue and discuss their work. She explains the hierarchy of groups from the obscure locals to the high-profile groups that often appear on television. If there is one main criticism I would bring up, it's that I would have liked there to be more biographical material on specific individuals, clubs, and organizations.

In an odd way, one of the worst things all this sciencey thinking can result in, other than maybe a president who believes in and promotes pseudoscience (I guess it's too late for that), is that some of these paranormal researchers will actually discover some important fact or understanding of how the universe works. Due to their lack of academic training or blinkered view they will not even realize they have done it, and it will be lost. There is also the issue of the often-undiscussed aspect of all this stomping around.

The populist pretentions of most of the paranormalists conform with the notion of knowledge source reversal, the idea that untutored amateurs know more (and are more trustworthy) than professional scholars. It is an inherent attack upon how knowledge is acquired and trusted. On the fringes—which keep edging closer to the center—one can indulge their interests in the type of knowledge mostly abandoned by mainstream scholars and be able to wave the flag of righteous obscurantism in the faces of the boffins holed up in their ivory tower libraries and laboratories. This gives the extra kick to the rush of sciencey thinking: we really know more about this than those eggheads with their fancy degrees and affiliations. We, say the amateurs, are the *real* scientists, the *real* historians, the *real* archaeologists.

There is little interdisciplinarity in the world of sciencey studies; UFOlogists, for example, rarely sit down with ghost hunters or flat-Earthers to compare notes.

Harassment (both real and imagined—though mostly imagined) by mainstream science, professional academics, and the government is a sign of valor, a sign that says, "We must be doing something right if all these eggheads with their fancy degrees say we're wrong." They fight, however, a power that has no idea they even exist. They are tragic heroes who look and look and look, yet never find any convincing evidence of alien abductions, ghosts, Bigfoot, or the location of the Ark of the Covenant. In this light, Hill's book can be read as something of a tragedy.

In the end, it's easy to dismiss the paranormalist aficionados as all these sad, lonely people running around looking for the little bits of junk evidence they think will prove their obscure and esoteric theories, give meaning to their lives, and change the world. They tend to generate more sympathy bordering on pity than hatred. They engage blithely in confirmation bias, selective evidence compiling, and the backfire effect while all the time complaining that it is the other side doing it. If they didn't, it wouldn't be any fun, really. They need the mainstream; after all, to be the outsider, the rebel, the rejected or ignored genius, there must be insiders to be ignored by. They, like all of us, are ultimately not searching for ghosts or the Loch Ness Monster; they are looking for themselves.

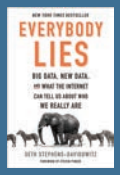
Sharon Hill's book should be read by anyone interested in paranormal studies, fringe pop cultural ideas, or intellectual history. It is well written, cogent, and well argued. It will be enjoyed by both believers and nonbelievers alike and is a significant addition to the growing literature on amateur paranormal research. Hopefully it will inspire others to venture down this quirky and baffling, yet somehow oddly entertaining, path.

The final lesson to be taken away from this worthwhile text is that the scientifical Americans will not be deterred by anything the mainstream might say about them. Just as obvious and proven revelations of wrongdoing and chicanery by politicians will never deter their most ardent followers, the odd birds of paranormal research will continue to sing their strange songs regardless of whether anyone hears them or not, and other members of the forest will continue to be impressed enough to mimic them. ■

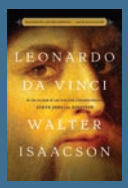
Brian Regal teaches the history of science, technology, and medicine at Kean University. He is the coauthor, with Frank J. Esposito, of the forthcoming *The Secret History of the Jersey Devil: How Quakers, Hucksters, and Benjamin Franklin Created a Monster*, to be published by Johns Hopkins University Press.

[NEW AND NOTABLE

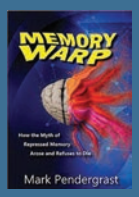
Listing does not preclude future review.



EVERYBODY LIES: Big Data, New Data, and What the Internet Can Tell Us about Who We Really Are. Seth Stephens-Davidowitz. Foreword by Steven Pinker. Yes, everybody lies, and now we have ways of quantifying it. The author, a former Google data scientist, uses Google search tools, mainly Google Trends and Google AdWords, plus his own algorithm developed as his PhD dissertation, to study how frequently words or phrases are searched for in different locations and times. The results tell us things public opinion polls and other conventional tools can't, some of them disturbing—like actually how and when many people search for racist terms (much more frequently than you'd think) and where they live, not just in the South but across parts of the East and upper Midwest east of the Mississippi. People reveal more about their sexual concerns in their online searches than in any polling. The revelations keep coming, he says, about mental illness, child abuse, abortion, religion, and health. We have an entirely new, enormous dataset that offers "surprising new perspectives" on all these fields. "Let me blunt," says the author: "I am now convinced that Google searches are the most important dataset ever collected on the human psyche." This book is the result of his mining that treasured dataset and many others: Facebook, Wikipedia, and others. The data are all anonymous but, when analyzed, extraordinarily revealing. Harper Collins, 2017, 338 pp., $27.99.



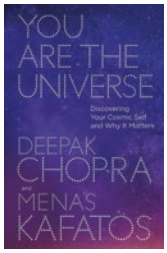
LEONARDO DA VINCI. Walter Isaacson. Today Leonardo seems best known for his *Mona Lisa* and *The Last Supper* paintings, but he was of course a highly original Renaissance genius of broad interests and deep curiosity who in everything he did combined art and science, an aesthetic sense with a desire to understand the most basic workings of nature. In this fresh and reader-friendly new biography, Walter Isaacson emphasizes the unique ways of thinking Leonardo brought to all of his work, with deep study and understanding of light, shadows, and optics, dissection of bodies to understand their underlying musculature, and study of the behavior of water, including eddies and vortexes. He made detailed, systematic observations and designed and carried out clever experiments. Isaacson examines each of Leonardo's paintings and each of the topics Leonardo studied, showing his unique abilities to illustrate the inner workings of everything from complex machines to the anatomy, neurology, and physiology of the human body. His anatomical dissections and his studies of eddies in fluids enabled him to understand how the aortic valve works centuries before others reached the same insights. The paradox: In his hundreds of surviving notebooks totaling 7,200 pages, Leonardo documented all his studies, with beautiful and creative illustrations. But he didn't publish any of this, leaving future generations to rediscover and appreciate his extraordinary insights. With color images of 144 of Leonardo's drawings and paintings. Simon & Schuster, 2017, 599 pp., $35.



MEMORY WARP: How the Myth of Repressed Memory Arose and Refuses to Die. Mark Pendergrast. Pendergrast is author of about a dozen books, several of them on false memories (including *Victims of Memory* and the recent *The Most Hated Man in America*, about the accusations against Penn State coach Jerry Sandusky). Though the heyday of false memories (often linked to the Satanic Panic of the 1980s and 1990s) is gone, this book is a timely warning to those who thought that the memory wars had been won—or at least settled. As Pendergrast demonstrates, discredited theories of repressed memory are still very much with us in modern America. To psychologists and skeptics, the

Yet Another Title on 'Quantum' Consciousness

SADRI HASSANI



You Are the Universe: Discovering Your Cosmic Self and Why It Matters. By Deepak Chopra and Menas Kafatos. Harmony Books, New York, 2017. ISBN 978-0-307-88916-4. 288 pp. Hardcover, $16.37.

The authors of *You Are the Universe* are two highly qualified pseudoscientists well suited to write this title. Deepak Chopra, the guru of consciousness, needs no introduction. Menas Kafatos, however, may not be a household name. Despite being touted as a "highly respected physicist" by Michael Shermer, publisher of *Skeptic* magazine, and a "quantum physics expert" by Leonard Mlodinow, a Caltech physics professor, Kafatos is neither. He is as much respected in the physics community as Chopra is in the medical community, and his only connection with quantum theory (QT) is its alleged mystical relation with consciousness. His lack of understanding of even the basics of QT shows up on page 116: "Electrons, at least for the lowest orbits, travel in a perfect circle around the nucleus of an atom." Every physics sophomore learns that the idea of an orbit violates the uncertainty principle.

I am focusing on credentials because bragging about them is how pseudoscientists sell their groundless ideas to the unsuspecting public. Kafatos's resume reveals his earlier expertise as computational physics with an emphasis in space science. But for almost three decades, his concentration has been on consciousness, the favorite topic of his mentor, Chopra, whose foundation awarded Kafatos the Spirit of Rustum Roy Award in 2011.

You Are the Universe is about the "conscious" universe. The narrative is presented with sophistic oratory—of the kind that convinces a jury of the innocence of a guilty suspect. Masterfully crafted scientifically inaccurate analogies are used to mislead the readers into thinking that they now finally understand QT. For example, on the creation and annihilation of virtual particle-antiparticle pairs in vacuum: "creating something out of nothing [such as creating a word and uttering it] is a human process" (35).

Quantum theory is the holy grail of pseudoscience thanks to the mystical ideas injected into it by some

great physicists, including its founders, as well as John Wheeler and Freeman Dyson, whose ideas contribute to the book. They are Nobel-caliber physicists notorious for their mystical beliefs. At the annual meeting of the AAAS in 1980, Wheeler was placed on a program with three parapsychologists. Dyson was awarded the Templeton Prize in 2000. Wheeler believed that "observer" is a "participator" and the universe is brought into being by their participation. It is no exaggeration to say that *You Are the Universe* is an exposé of this single idea (pp. 3–4, 18–19, 69–70, 82–84, 109–112, 134–135, 144–47, 161–64). John Bell, an authority on QT who proved its nonlocality, strips quantum theory from mysticism:

> The only "observer" … is the inanimate apparatus which amplifies microscopic events to macroscopic consequences. … Once the apparatus is in place and functioning untouched, it is a matter of complete indifference whether the experimenters stay around to watch, or delegate such "observing" to computers. (p. 170 of *Speakable and Unspeakable in Quantum Mechanics*)

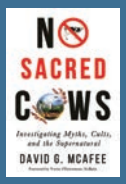
Every chapter of *You Are the Universe* is headed by a question followed by a long discussion of (sometimes irrelevant) topics mostly from physics but also from neuroanatomy. The discussions are only a distraction from the age-old strategy of all pseudoscientists: to boast their authority and, using *it*, to inject their own unsubstantiated claims as answers to open questions in science.

The answer to every chapter heading boils down to two words: conscious universe.

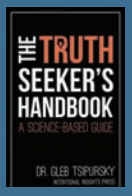
"What Came Before the Big Bang?" The real answer requires the unification of general relativity (GR) and quantum theory, the most challenging problem in physics. This chapter contains an illustrative example of the authors' disdain for science. Gravitational waves (GWs), predicted by GR and whose detection by three physicists won the 2017 Nobel Prize, "serve as a distraction from the unsolved mysteries [notably, consciousness]. … The confirmation wasn't a … breakthrough in terms of understanding the universe. They fulfilled a prediction that was almost a century old" (17). In their *HuffPost* article, they use "red herrings" to describe gravitational waves. Physics has a lot of "red herrings." Electromagnetic waves (EMWs) were discovered twenty-two years after Maxwell predicted them in 1865. Imagine what would have happened if physicists really believed that EMWs were "red herrings" in 1887: our entire high-tech gadgetry that has probed the heart of matter to the tiniest scale and has reached the edge of the universe 13.8 billion light-years away would have been impossible; not to mention the comfort with which we have been so inescapably accustomed.

"What Is the Universe Made Of?" Instead of talking about subatomic particles, the authors delve into another unsolved problem in physics related to the big bang: black holes. Wheeler's participatory universe gives the answer:

notion of repressed memories has been thoroughly discredited, due in large part to the pioneering research of Elizabeth Loftus, recipient of the Maddox Prize (see SI, March/April 2017). But—like homeopathy, faith healing, and so many other topics well-known to the scientifically knowledgeable as baseless—the vast majority of Americans are unaware of this fact. Due in part to well-intentioned but misguided (and enormously influential) "victim support" books such as *The Courage to Heal*, bogus claims about repressed memories are still very much with us and still victimizing innocent people. Upper Access Books, 2017, 444 pp., $19.95.



NO SACRED COWS: Investigating Myths, Cults, and the Supernatural. David G. McAfee. With a foreword by Yvette d'Entremont—better known as SciBabe. In seventeen chapters, McAfee (author of several books on secular and atheist topics) covers a wide range of skeptical subjects, including ghosts, psychics, aliens, conspiracy theories, psychological biases, science communication, and much more. McAfee includes interviews with luminaries such as Banachek (a newly elected CSI fellow and one of the two Project Alpha mentalists who fooled scientists under the direction of the Amazing Randi); Nate Phelps (social activist fighting intolerance); Jim Underdown (Independent Investigations Group leader); Michael Shermer (publisher of *Skeptic* magazine), and others. But he also interviews some true believers including self-styled psychics as well. This is done not in service of false equivalence but instead to let them explain their worldviews; it provides insight into how they think and therefore into how best to approach their claims and perchance change their minds. McAfee's stint as "Suroh the Seer" is reminiscent of Ray Hyman's early foray into palm reading as well. An informed and enlightening read blending personal experience with the major tenets of organized skepticism. Pitchstone Publishing, 2017, 444 pp., $17.95.



THE TRUTH SEEKER'S HANDBOOK: A Science-Based Guide. Gleb Tsipursky. In 267 oversized pages, Tsipursky (creator of the Intentional Insights project and an assistant professor at Ohio State University) and nine collaborators attempt to provide pragmatic tools to help you improve your rationality by discarding false beliefs and developing a clearer version of reality. This, explains Tsipursky, may help avoid what most people do: "let their thoughts, feelings, and behavior patterns drift on waves of life experience, buffeted by storms of dramatic events and floating calmly in more quiet times." The fifty-one chapters are based on research in behavioral science; you can read all the cited papers from links given in the digital version. Intentional Insights Press, 2017, 267 pp., $19.99.

UNDEAD UPRISING: Haiti, Horror, and the Zombie Complex. John Cussans. In pop culture, zombies now rival vampires in popularity: television, books, films, and graphic novels are rife with these undead characters, from *World War Z* to *The Walking Dead*. Stories and legends of spirits and the undead have been with us for millennia, but as John Cussans reveals, the zombie has a very specific history rooted in the Vodou folklore of Haiti. Involving figures as disparate as Anton Mesmer, Wes Craven, ethnobotanist Wade Davis, and dictator "Papa Doc" Duvalier, Cussans examines how the zombie figure has been exploited and co-opted by Hollywood, used to justify xenophobia and racism, and much more. In explaining the phenomenon, Cussans proposes the "Zombie Complex, a range of ethical, psychological, and political thought-problems clustered around the central figure of the living corpse." Skeptics interested in cryptozoology and folklore will enjoy this fascinating look at the cultural, historical, and political origins of the Haitian zombie. Strange Attractor/The MIT Press, 2017, 404 pp., $26.95.

—Kendrick Frazier and Benjamin Radford

"looking at the whole universe, its stars and galaxies … actually transform[s] them" (112). So, you see, the universe is made by our mind.

"Is The Quantum World Linked to Everyday Life?" The authors provide another chapter on participatory interpretation of quantum theory with an obvious answer.

You Are the Universe is riddled with flawed information touted as science:

"Matter is constantly being transformed into energy and vice versa, as E=mc2 verified" (86). No; energy is a *property* of objects. No energy exists without some material object carrying it.

There is no such thing as *the* "quantum field" (40, 67, 78–80, 89, 100, 111, 222). Every fundamental particle has its own quantum field.

"… Quantum domain, and reality itself, has a psychological component" (92). No!

A "solid atom" (97) makes as much sense as "living in a brick." Just as a living quarter needs thousands of bricks and other construction materials, a solid (or a liquid) requires countless number of atoms.

The "atom vanishes into the quantum vacuum" (98). This is a convenient untruth to justify the pseudoscientific equivalence of matter and spirit. The vanishing of atoms violates the undisputable principle of energy conservation.

It baffles the mind how a medical doctor and a computational physicist have been able to solve puzzles that more than 600 Nobel laureates in physics, chemistry, and physiology and medicine have been unable to solve in the past 117 years! ■

Sadri Hassani is adjunct professor of physics at the University of Illinois at Urbana-Champaign and professor emeritus of physics at Illinois State University. He has written several articles for SI and is the author of several books at graduate, undergraduate, and introductory levels. His blog at skepticaleducator.org is devoted to exposing pseudoscientific misconceptions and distortions of science.

[LETTERS TO THE EDITOR

Legend Traveling

In Jeffrey Debies-Carl's conspiracy legends article in the November/December 2017 Skeptical Inquirer, I was struck by the author's statement that, "Inspired by a legend, a person may travel to the alleged site of a story to investigate its validity directly." I have an interesting experience in that regard. In my neighborhood in Vienna, Virginia, was a small group of homes locally called "Midgetville." The houses were built during an era when the adjacent railroad was operating, and they were used as a weekend escape from the heat of Washington, D.C. The area was called Midgetville not because midgets lived there but because the motley collection of houses was very small. On one occasion, I spoke to some people who had heard the legends about the place and had traveled all the way from Canada to see the midgets. They were quite disappointed that their long trip was in vain. Wikipedia has an article on Midgetvilles in other locations.

Raoul Drapeau
Ashburn, Virginia

Science Popularizer Dan Q. Posin

Stuart Vyse's thorough and fascinating article on Dan Q. Posin acquainted me with a heroic figure I'd never heard of (November/December 2017).

A couple of observations: "In 1914 his parents fled in advance of the Russian Revolution." This reads as if SI, which I've read since it was *The Zetetic*, has for the first time endorsed an ability to foretell the future. Nobody foresaw the Bolshevik triumph; Lenin himself said in January 1917 that his generation of radicals might not live to see the revolution. The World War itself was a surprise to most, and in its course a great many unforeseeable things happened. Surely Vyse did not mean to impute prophetic vision to the Posin family, and surely the unstable, depressing, and pogrom-infested state of Imperial Russia in 1914 sufficed to make emigration seem a promising idea.

And a relatively trivial point—Vyse later mentions the 1939 Einstein letter to Roosevelt, calling for the United States to look into nuclear energy lest the Nazis get it first. Leo Szilard wrote the letter; Einstein (a more celebrated figure, likely to catch the attention of nonscientists) was persuaded to sign it.

Martin Berger
Prof Emeritus, History
Youngstown State
Youngstown, Ohio

Stuart Vyse replies:

In fact, I do not know why the Posin family left Russia, and as a result, I should probably have omitted my speculation about the Russian Revolution. As Professor Berger points out, the pogroms and other factors might very well have been the motivation, but I just don't know the answer. Whatever the reason, it was sufficient to sustain the family through a very difficult three-year-long trip. I also thank Professor Berger for the clarification on the Szilard-Einstein letter.

Move Statistical Goalposts?

Reading "Moving Science's Statistical Goalposts" in the November/December 2017 issue, I have a bone to pick. Yes, statistical significance is a "holy grail." The solution is not moving the goalposts; it's getting rid of them. Research that fails to reach "statistical significance" can still impart knowledge. If nothing else, meta-analysis requires finding all available research on a set of variables. Research that never gets published is often never found and included.

Get rid of goalposts and grails. As long as the research was conducted competently according to the standards of science and the results are properly qualified and discussed in the context of possible statistical error, it should be published regardless of the "significance" level. Replace "p <" with "p =" and publish it,

perhaps in a less prestigious journal. "Slimmer journals" means less knowledge available to researchers. How can that possibly be considered a good thing?

James Brentar
Lyndhurst, Ohio

Stuart Vyse replies:

I agree with several of the points made by James Brentar. There has long been push-back on the use of statistical significance as a measure of worth in science, and some have proposed that effect size should be used instead. It is also the case that many journals are now reporting exact p-values rather than just p < .05, which is an improvement. But as much as people have railed against statistical significance tests as a hurdle for publication, they seem to persist. The proposal to use the more stringent p < .005 significance level that I reported on was offered as a solution to the current replication crisis, primarily in social psychology, and there is little doubt that such a change would eliminate many Type I errors. But the larger question that Brentar raises about the usefulness of statistical significance tests in general is still worthy of discussion.

Government and Science

In the article "Ten Questions (and Answers) about Teaching Evolution," author Bertha Vasquez offers an answer that is factually incorrect. She states in her response to a question of whether or not the current administration will affect science education that "The people President Donald Trump has hired and the decisions being made will slow down this positive trend. (See, for example, Florida SB 989 which went into effect on July 1, 2017. It allows any county resident—not just parents—to challenge materials used in the public schools.)"

She certainly must realize that a Florida senate bill has absolutely nothing to do with the Executive Branch of our federal government. As a Florida resident, I was opposed to the bill, but I did not try to blame the president for it. Knee-jerk reactions of condemning Donald Trump for actions that clearly are not his doing only diminish the credibility of skeptics. If the only example the authors can give for the opposition to science education by the administration is clearly a false one, they have undermined their own premise.

William A. Robinson
Jacksonville, Florida

Bertha Vazquez replies:

The reader is correct. There is no direct relationship between the president and the Florida Senate Bill, which is now a law. My point was that the people being hired are antiscience, which is true. However, I should have been more clear in my writing.

Tests of Astrology

Belgian skeptic Tim Trachet (Letters, November/December 2017) claims that I and the other three authors of *Tests of Astrology* "show their sympathy for Gauquelin, but that is not a good reason to trivialize objections coming from [true] skeptics." To support this supposed trivialization he cherry picks the evidence, whereas in our Gauquelin account we consider all the evidence. In his review in SI (May/June 2017) Ivan Kelly agrees, describing our account as "extended . . . (forty-eight pages)." Trachet may not like our account but is that a good reason to misrepresent it?

Geoffrey Dean
Perth, Western Australia

'Theory' in Popular Usage

In "Amelia Earhart: The Lost Evidence," Benjamin Radford uses the word *theory* in a very light way. I understand that he may have been using it in the common vernacular, as an opinion or conjecture, but I believe that a magazine for science and reason should be very careful about how it is used in the magazine. Unfortunately, the word is used incorrectly in many scientific publications, and so that gives grist to the creationist mills that "theory" means a guess. It would be better for SI to always use the word in its scientific meaning, a body of work supported by vast amounts of evidence, so as to avoid confusion. Radford's statement, "There's nothing wrong with guesses and theories—as long as they are presented as such and not all-but-verified facts" is especially egregious and is certainly fuel for the ill-informed, who are always saying "evolution's just a theory." Just what's wrong with the word "idea?"

Brian Myres
Highlands Ranch, Colorado

In response to "History Channel's Credibility MIA Following Amelia Earhart Special" and many other articles and letters. We have a nomenclature problem. Most scientists I know are careful to call settled truths in science "theories." The Theory of Gravity, Theory of Evolution. Laypersons almost never use the word "theory" that way.

They use it to denote matters that are tenuous at best. I think it is critically important that Skeptical Inquirer be scrupulous in using "theory" as is meant in science, not in ordinary parlance. For example, on page 11 in the Earhart article the bold print states "There's nothing wrong with guesses and theories—as long as they are presented as such and not all-but-verified facts." That passage should read, "There's nothing wrong with guesses and hypotheses," assuming a theory is a settled fact. Please do this little favor for us who are trying to pry real science from day to day assumptions.

Sharon Scholl
Atlantic Beach, Florida

Benjamin Radford replies:

The subject of the piece was Earhart conspiracy theories—a phrase I of course did not invent but am obliged to use in the interest of clarity. Many common words (theory, energy, etc.) have both scientific and popular meanings; what makes a word usage correct is the context, and the context was clear: There is nothing about an experiment, control group, variables, or anything else that would mark the word as being used in a scientific sense. Because of my respect for the intelligence of SI readers, I am not worried that they will be confused by my usage of the word theory in the context of a piece about conspiracy theories.

Rose Mackenberg

In Terence Hines's review of Tony Wolf's book about Rose Mackenberg, *Houdini's "Girl Detective"* (Skeptical Inquirer, September/October 2017, pp. 62–63), he states that "Until the publication of this book, the only description of her [in the skeptical literature] was in a short piece by Loren Pankratz in the July/August 1995 Skeptical Inquirer (pp. 28–29)."

This is almost but not quite accurate. CSICOP Fellow Daniel Loxton, editor of *Junior Skeptic*, showcased Rose Mackenberg and NYPD detective and fortune-teller fraud buster Mary Sullivan the forty-sixth issue of *Junior Skeptic* back in 2013, inside *Skeptic* magazine vol. 18, no. 1. The *Junior Skeptic* cover features Sullivan on the left and Mackenberg on the right.

Jim Lippard
Phoenix, Arizona

[FEEDBACK

The letters column is a forum on matters raised in previous issues. **Letters should be no longer than 225 words**. Due to the volume of letters we receive, not all can be published. Send letters as email text (not attachments) to letters@csicop.org. In the subject line, provide your surname and informative identification, e.g.: "Smith Letter on Jones evolution article." Include your name and address at the end of the letter. You may also mail your letter to the editor to 944 Deer Dr. NE, Albuquerque, NM 87122.

David vs. Whatsisname

GEORGE HRAB

I'm not sure I get the point of the story of David and Goliath. And just for clarity, I'm talking about the biblical story, not the 1970s claymation creep-fest that used to give me morality-based fever dreams. (What the hell is this? It *looks* like *Rudolf* or *Heat Miser* but it's all Jesus-y. *And why is the dog talking?*) In the Bible, more specifically in the book of Samuel, David (our hero) fights Goliath (not our hero) because Saul and the Israelites[1] are for some reason at odds with the Philistines. The Philistines send out Goliath, twice a day for forty days, to cream the living hummus out of any Israelite who even thinks about looking at him funny. Finally, some kid named David decides to go fight the significantly larger-than-himself Goliath, and by using a sling and some rocks slams the G-Man smack in the forehead, kills him, and wins. This is followed by three thousand years of abject peace in the Middle East.[2] Yay, Bible!

Okay …

You could say this story is about being an underdog and beating a much larger foe.

You could say this story is about fighting smart.

You could say this story is about showing that David is the true king of Israel.

You could also say this story proves that Trump couldn't have groped those women.

But let me repeat: I'm not sure I get the point of the story of David and Goliath.

The Israelites are getting pounded twice daily by Goliath. Goliath: an *individual*. Yeah, he's huge, but there are thousands of Israelites, right? I know the number one rule of ninja warfare expressly prohibits more than one fighter out of a mob of fighters fighting at a time, but these are Jews in the desert. Chop, chop; bum rush the dude and get it over with. Now there's a good lesson: work together and you can overcome any large obstacle, as opposed to sitting around and hoping for some lucky one-in-a-million shot to the forehead from a random pipsqueak's "Dennis The Menace" home sling-kit. And as for the Philistines, why are you sending out your best and biggest dude out to fight—*twice a day?* Even WWE wrestlers get time off between multiple bouts. No wonder he gets beaten after a cheap shot from some surly brat. He's exhausted. Here's an idea: have your army of desert-based sand warriors fight their significantly smaller army of chosen troopers, then right after, everyone can go try and figure out how long a cubit is while having a refreshing schvitz. Easy peasy.[3]

Or how about this question: Is David cheating? I mean, he's using a projectile weapon for hand-to-hand combat. Where's the sport in that? Is that the moral? If your opponent is stronger than you, *cheat*. I know it's the "Chi-KAH-go Way" to bring a gun to a knife fight, but maybe the "Valley-of-Elah Way" is to bring a wrist canon to a boxing match. If you can't beat 'em, shoot 'em.[4] Nice lesson.

And now to make this buffet even less kosher, while hunting around for details about this particular biblical story, I discovered that there's apparently a bit of discordance as to whether or not Goliath was even killed by David. Wait … a Bible inconsistency? Whaaa? Anyway, David kills Goliath in 1 Samuel 17, but then some dude named Elhanan kills Goliath in 2 Samuel 21:19. There's an absolute tzedakah-full of websites valiantly trying to explain away this discrepancy (mostly talmudic based) that are a twisty, pretzely joy to wade through and read. (Was "Goliath" a title? Was it his twin? Was it his brother? Are Elhanan and David the same person? Does The War Doctor count as a regeneration? Oy vey …) I had never heard of Elhanan before, so now I'm going to go check out all his early albums.[5]

Which returns me to the completely dull and by now pencil-nubbed point I'm trying to make. I realize that stories such as these are supposed to engender multiple interpretations that result in raised eyebrows and scrunched shoulders, and I know that I'm not having some massive Jerusalem Syndrome–based revelation here. It could mean this, it could mean that, and it's all supposed to make you … think? I guess? Dunno. It's just another incredible example of a Bronze Age story that has stuck around way past its explanation date.

After some personal contemplation, a touch of ritualistic fasting, and a significant amount of semi-public Charlton Heston cosplay, I've decided that I'm going to go with the following as the moral of the story of David and Goliath. Ready? Here goes: "Eat fresh fruit often."

Why not? Makes just as much sense as anything else and could actually affect your life. Or colon. Or both.

Here's to hoping all the foes you fight are exactly the size you want them to be. And have a banana.

Notes

1. Their highest charting hit was "Why Do Fools Fall in Kreplach."
2. This might not be fully accurate.
3. Or more accurately: oishy poishy.
4. I know launching a rock is not technically "shooting," but 2nd Amendment.
5. "Eyerlekh on Main Street," "Challah Need Is Love," "Bat Out of Helzel"

George Hrab is a skeptic, writer, musician, and songwriter.

Committee for Skeptical Inquiry

Scientific and Technical Consultants

Gary Bauslaugh,
writer and editor,
Victoria, B.C., Canada

Richard E. Berendzen,
astronomer, Washington, DC

Martin Bridgstock,
senior lecturer, School of Science,
Griffith Univ., Brisbane, Australia

Richard Busch,
magician/mentalist, Pittsburgh, PA

Shawn Carlson,
Society for Amateur Scientists,
East Greenwich, RI

Roger B. Culver,
prof. of astronomy, Colorado State Univ.

Felix Ares de Blas,
prof. of computer science,
Univ. of Basque, San Sebastian, Spain

Nahum J. Duker,
assistant prof. of pathology,
Temple Univ.

Taner Edis,
Division of Science/Physics
Truman State Univ.

Barbara Eisenstadt,
psychologist, educator, clinician,
East Greenbush, NY

William Evans,
prof. of journalism and
creative media, Univ. of Alabama

Bryan Farha,
prof. of behavioral studies in
education, Oklahoma City Univ.

John F. Fischer,
forensic analyst, Orlando, FL

Eileen Gambrill,
prof. of social welfare,
Univ. of California at Berkeley

Luis Alfonso Gámez,
science journalist, Bilbao, Spain

Sylvio Garattini,
director, Mario Negri Pharmacology
Institute, Milan, Italy

Susan Gerbic,
founder and leader of the Guerilla Skepticism on Wikipedia (GSoW) project

Laurie Godfrey,
anthropologist, Univ. of Massachusetts

Gerald Goldin,
mathematician, Rutgers Univ., NJ

Donald Goldsmith,
astronomer; president, Interstellar Media

Alan Hale,
astronomer, Southwest Institute for Space
Research, Alamogordo, NM

Clyde F. Herreid,
prof. of biology, SUNY Buffalo

Sharon Hill,
geologist, writer, researcher, creator and
editor of the *Doubful News* blog

Gabor Hrasko,
chairman of the European Council of Skeptical Organizations (ECSO), president
of Hungarian Skeptics

Michael Hutchinson,
author; Skeptical Inquirer
representative, Europe

Philip A. Ianna,
assoc. prof. of astronomy,
Univ. of Virginia

I.W. Kelly,
prof. of psychology, Univ. of Saskatchewan,
Canada

Richard H. Lange,
MD, Mohawk Valley Physician
Health Plan, Schenectady, NY

William M. London,
California State Univ., Los Angeles

Rebecca Long,
nuclear engineer, president of Georgia
Council Against Health Fraud, Atlanta, GA

John R. Mashey,
computer scientist/executive (Bell Labs, then
Silicon Valley), analyst of climate-change
denial, contributor to *DeSmogBlog* and
Skeptical Science, Portola Valley, CA

Thomas R. McDonough,
astrophysicist, Pasadena, CA

James E. McGaha,
astronomer, USAF pilot (ret.)

Joel A. Moskowitz,
director of medical psychiatry, Calabasas
Mental Health Services, Los Angeles

Matthew C. Nisbet,
professor of communication studies, public
policy, and urban affairs at Northeastern
University

Julia Offe,
neurobiologist, science journalist, creator
of German Science Slam

John W. Patterson,
prof. of materials science and
engineering, Iowa State Univ.

James R. Pomerantz,
prof. of psychology, Rice Univ.

Gary P. Posner,
MD, Tampa, FL

Tim Printy,
amateur astronomer, UFO skeptic, former
Navy nuclear reactor operator/division chief,
Manchester, NH

Daisie Radner,
prof. of philosophy, SUNY Buffalo

Robert H. Romer,
prof. of physics, Amherst College

Karl Sabbagh,
journalist, Richmond, Surrey, England

Robert J. Samp,
assistant prof. of education and
medicine, Univ. of Wisconsin-Madison

Steven D. Schafersman,
asst. prof. of geology, Miami Univ., OH

Chris Scott,
statistician, London, England

Stuart D. Scott Jr.,
associate prof. of anthropology,
SUNY Buffalo

Erwin M. Segal,
prof. of psychology, SUNY Buffalo

Carla Selby,
anthropologist / archaeologist

Steven N. Shore,
prof. of astrophysics, Univ. of Pisa, Italy

Waclaw Szybalski,
professor, McArdle Laboratory, Univ.
of Wisconsin-Madison

Sarah G. Thomason,
prof. of linguistics, Univ. of Pittsburgh, PA

Tim Trachet,
journalist and science writer, honorary
chairman of SKEPP, Belgium

David Willey,
physics instructor, Univ. of Pittsburgh, PA

Affiliated Organizations | United States

ALABAMA
Alabama Skeptics, Alabama. Emory Kimbrough. Tel.: 205-759-2624. 3550 Watermelon Road, Apt. 28A, Northport, AL 35476

ARIZONA
Tucson Skeptics Inc. Tucson, AZ. James McGaha. Email:mcgaha@skepticus.com. 5100 N. Sabino Foothills Dr., Tucson, AZ 85715

Phoenix Area Skeptics Society (PASS) http://phoenixskeptics.org
Email: phoenixskeptics@gmail.com

Phoenix Skeptics, Phoenix, AZ. Michael Stackpole, P.O. Box 60333, Phoenix, AZ 85082

CALIFORNIA
Sacramento Organization for Rational Thinking (SORT) Sacramento, CA. Ray Spangenburg, co-founder. Tel.: 916-978-0321; Email: kitray2@comcast.net. PO Box 2215, Carmichael, CA 95609-2215 http://home.comcast.net/~kitray2/site/

Bay Area Skeptics (BAS) San Francisco–Bay Area. Eugenie C. Scott, President. 1218 Miluia St., Berkeley, CA 94709. Email: scott@ncse.com. www.BASkeptics.org

Independent Investigations Group (IIG), Center for Inquiry–Los Angeles, 4773 Hollywood Blvd, Los Angeles, CA 90027. Tel.: 323-666-9797. www.iigh q.com

Sacramento Skeptics Society, Sacramento. Terry Sandbek, President. 4300 Auburn Blvd. Suite 206, Sacramento CA 95841. Tel.: 916 489-1774. Email: terry@sandbek.com

San Diego Association for Rational Inquiry (SDARI) President: Tom Pickett. Email: pickett.thomasj@gmail.com. Program/general information 619-421-5844. www.sdari.org. Postal address: PO Box 623, La Jolla, CA 92038-0623

CONNECTICUT
New England Skeptical Society (NESS) New England. Steven Novella M.D., President. Tel.: 203-281-6277; Email: board@theness.com. 64 Cobblestone Dr., Hamden, CT 06518 www.theness.com

D.C./MARYLAND
National Capital Area Skeptics NCAS, Maryland, D.C., Virginia. D.W. "Chip" Denman. Tel.: (240) 670-6227. Email: ncas@ncas.org. PO Box 8461, Silver Spring, MD 20907-8428 http://www.ncas.org

FLORIDA
Tampa Bay Skeptics (TBS) Tampa Bay, Florida. Rick O'Keefe, contact person. Tel.: 813-505-7013; Email: tbs@centerforinquiry.net. c/o O'Keefe, 4011 S. Manhattan Ave. #139, Tampa, FL 33611-1277. www.tampabayskeptics.org

ILLINOIS
Rational Examination Association of Lincoln Land (REALL) Illinois. Bob Ladendorf, Chairman. Tel.: 217-546-3475; Email: chairman@reall.org. PO Box 20302, Springfield, IL 62708 www.reall.org

Chicago Skeptics Jennifer Newport, contact person. Email: chicagoskeptics@gmail.com. www.chicagoskeptics.com

LOUISIANA
Baton Rouge Proponents of Rational Inquiry and Scientific Methods (BR-PRISM) Louisiana. Marge Schroth. Tel.: 225-766-4747. 425 Carriage Way, Baton Rouge, LA 70808

MICHIGAN
Great Lakes Skeptics (GLS) SE Michigan. Lorna J. Simmons, Contact person. Tel.: 734-525-5731; Email: Skeptic31@aol.com. 31710 Cowan Road, Apt. 103, Westland, MI 48185-2366

Tri-Cities Skeptics, Michigan. Dr. Gary Peterson. Tel.: 989-964-4491; e-mail: peterson@svsu.edu. www.tcskeptics.blogspot.com

MINNESOTA
St. Kloud Extraordinary Claim Psychic Teaching Investigating Community (SKEPTIC) St. Cloud, Minnesota. Jerry Mertens. Tel.: 320-255-2138; Email: gmertens@stcloudstate.edu. Jerry Mertens, Psychology Department, 720 4th Ave. S, St. Cloud State Univ., St. Cloud, MN 56301

MISSOURI
Skeptical Society of St. Louis (SSSL) St. Louis, Missouri. Michael Blanford, President. Email: info@skepticalstl.org. 2729 Ann Ave., St. Louis, MO 63104 www.skepticalstl.org

St. Joseph Skeptics
P.O. Box 8908
St. Joseph MO, 64508-8908

NEVADA
Reno Skeptical Society, Inc.,
Brad Lutts, President.
Tel.: (775) 335-5505;
Email: info@RenoSkeptics.org. 18124 Wedge Parkway #1052 Reno, Nevada 89511. www.RenoSkeptics.org

NEW MEXICO
New Mexicans for Science and Reason (NMSR) New Mexico. David E. Thomas, President. Tel.: 505-869-9250; Email: nmsrdave@swcp.com. 801 Fitch Ave., Socorro, NM 87801. www.nmsr.org

NEW YORK
New York City Skeptics Michael Feldman, president. PO Box 5122 New York, NY 10185. www.nycskeptics.org

Central New York Skeptics (CNY Skeptics) Syracuse. Lisa Goodlin, President. Tel: (315) 636-6533; Email: info@cnyskeptics.org, cnyskeptics.org PO Box 417, Fayettville, NY 13066

OHIO
Central Ohioans for Rational Inquiry (CORI) Central Ohio. Charlie Hazlett, President. Tel.: 614-878-2742; Email: charlie@hazlett.net. PO Box 282069, Columbus, OH 43228

Cleveland Skeptics Joshua Hunt, Co-Organizer, www.clevelandskeptics.org

South Shore Skeptics (SSS) Cleveland and counties. Jim Kutz. Tel.: 440 942-5543; Email: jimkutz@earthlink.net. PO Box 5083, Cleveland, OH 44101 www.southshoreskeptics.org

Association for Rational Thought (ART) Cincinnati. Roy Auerbach, president. Tel: (513)-731-2774, Email: raa@cinci.rr.com. PO Box 12896, Cincinnati, OH 45212. www.cincinnati skeptics.org

OREGON
Oregonians for Science and Reason (04SR) Oregon. Jeanine DeNoma, president. Tel.: (541) 745-5026; Email: wilkinsa@peak.org; 39105 Military Rd., Monmouth, OR 97361. www.04SR.org

PENNSYLVANIA
Philadelphia Association for Critical Thinking (PhACT), Bob Glickman President. 653 Garden Road Glenside PA 19038. 215-885-2089 E-mail: President@phact.org. Website: www.phact.org

TENNESSEE
Rationalists of East Tennessee, East Tennessee. Carl Ledenbecker. Tel.: (865)-982-8687; Email: Aletall@aol.com. 2123 Stonybrook Rd., Louisville, TN 37777

TEXAS
North Texas Skeptics NTS Dallas/Ft Worth area, John Blanton, Secretary. Tel.: (972)-306-3187; Email: skeptic@ntskeptics.org. PO Box 111794, Carrollton, TX 75011-1794. www.ntskeptics.org

VIRGINIA
The James Randi Educational Foundation. James Randi, Director. 2941 Fairview Park Drive, Suite 105 Falls Church, VA 22042
Email: jref@randi.org
Telephone: 571-318-6530

Science & Reason, Hampton Rds., Virginia. Lawrence Weinstein, Old Dominion Univ.-Physics Dept., Norfolk, VA 23529

WASHINGTON
Seattle Skeptics
www.seattleskeptics.com

The organizations listed above have aims similar to those of the Committee for Skeptical Inquiry but are independent and autonomous. Representatives of these organizations cannot speak on behalf of CSI. Please send updates to Barry Karr, P.O. Box 703, Amherst NY 14226-0703.
International affiliated organizations listed at www.csicop.org.

CENTERS FOR INQUIRY
www.centerforinquiry.net/about/branches

Transnational
3965 Rensch Road, Amherst, NY 14228
Tel.: (716) 636-4869

Austin
PO Box 300036, Austin, TX 78703
Tel.: (512) 454-0977

Chicago
chicago@centerforinquiry.net

Indianapolis
350 Canal Walk, Suite A, Indianapolis, IN 46202
Tel.: (317) 423-0710

Los Angeles
4773 Hollywood Blvd., Hollywood, CA 90027
Tel.: (323) 666-9797

Michigan
3777 44th Street SE, Grand Rapids, MI 49512
Tel.: (616) 698-2342

New York City
33-29 28th St. Astoria, NY 11106

San Francisco
email: sf@centerforinquiry.net

Tampa Bay
4011 S. Manhattan Ave. #139, Tampa, FL 33611-1277
Tel.: (813) 505-7013

Washington, DC
1012 14th Street., NW, Suite 205
Washington, DC 20005
tel.: (202) 733-5275

Argentina
Buenos Aires, Argentina
alejandroborgo@gmail.com
Facebook: CFI Argentina

Canada
55 Eglinton Ave. East, Suite 307
Toronto, Ontario, M4P 1G8, Canada

China
China Research Institute for Science Popularization,
NO. 86, Xueyuan Nanlu Haidian Dist., Beijing,
100081 China
Tel.: +86-10-62170515

Egypt
44 Gol Gamal St., Agouza, Giza, Egypt

France
Dr. Henri Broch, Universite of Nice, Faculte des Sciences, Parc Valrose, 06108, Nice cedex 2, France Tel.: +33-492-07-63-12

Germany
Arheilger Weg 11, 64380 Rossdorf, Germany
Tel.: +49-6154-695023

India
46 Masi garh, New Friends Colony
New Delhi 110025
Tel.: 91-9868010950

London
Conway Hall, 25 Red Lion Square,
London WC1R 4RL, England

Nepal
Humanist Association of Nepal,
PO Box 5284, Kathmandu Nepal
Tel.: +977-1-4413-345

New Zealand
email: bcooke@centerforinquiry.net

Nigeria
PO Box 25269, Mapo, Ibadan, Oyo State, Nigeria
Tel.: +234-2-2313699

Peru
Ex. Dir. Manuel Paz-y-Miño
Calle El Corregidor 318, Rimac, Lima 25-PERU
email: humanarazon_peru@yahoo.com

Poland
Lokal Biurowy No. 8, 8 Sapiezynska Sr.,
00-215, Warsaw, Poland

Romania
Fundatia Centrul pentru Constiinta Critica
Tel.: (40)-(0)744-67-67-94
email: CenterforInquiry.Romania@gmail.com

Russia
Dr. Valerii A. Kuvakin, 119899 Russia, Moscow,
Vorobevy Gory, Moscow State Univ.,
Philosophy Department

Senegal
PO Box 15376, Dakar – Fann, Senegal
Tel.: +221-501-13-00

cfi
CENTER FOR INQUIRY